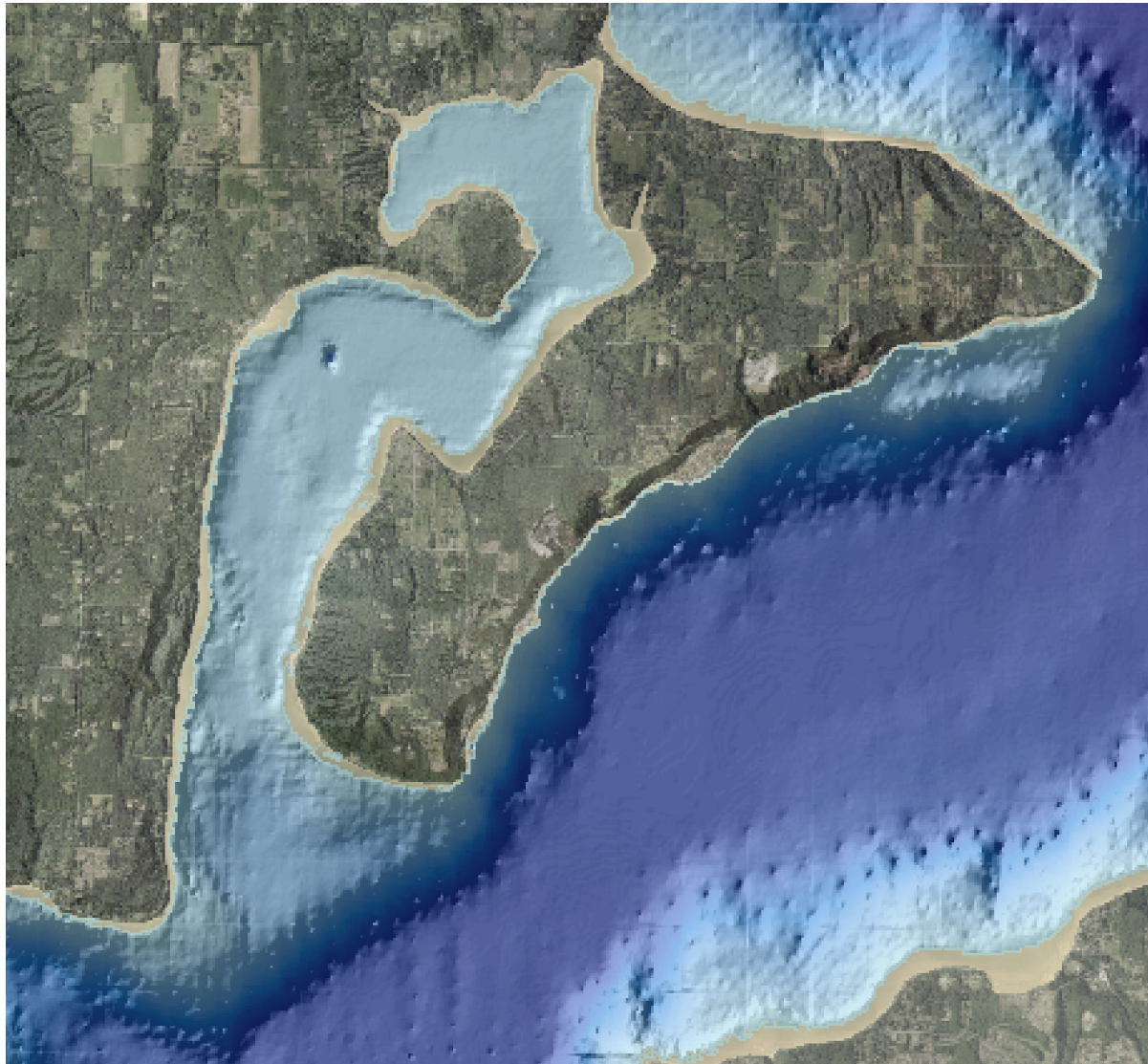


**Washington Department of Natural Resources
Aquatic Resources Division - Aquatic Reserves Program**



**Maury Island Environmental Aquatic Reserve
Draft Management Plan**

July 13, 2004



WASHINGTON STATE DEPARTMENT OF
Natural Resources
Doug Sutherland - Commissioner of Public Lands

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1.0 Executive Summary

The Washington State Department of Natural Resources (DNR) manages 2.4 million acres of aquatic lands in Washington to provide a balance of public benefits for the people of the state. These lands include shorelands, tidelands, and bedlands in the Puget Sound, along the Pacific Coast, and many freshwater navigable rivers and lakes throughout the state. Washington Administrative Code 332-30-151 establishes the guidance for DNR to establish aquatic reserves to ensure environmental protection of state-owned aquatic lands.

The Maury Island Aquatic Reserve was established as an environmental reserve to ensure environmental protection of the unique habitats and species identified in the area.

This plan identifies the habitats and species in the reserve and the actions that will be employed to protect these resources. The management emphasis will place protection of these resources above other management activities.

In general, within its statutory authority, DNR will limit new and continued uses in the reserve that may adversely affect the habitats and species identified for conservation within the reserve. New and continued activities authorized within the reserve must also implement actions that primarily serve the objectives of the reserve designation in support of the desired future conditions described in section 4.5.

The following management goals are established for the reserve:

- Conserve, at a minimum, and enhance, where there are opportunities, native habitats and associated plant and wildlife species, with a special emphasis on forage fish, salmonids, and migratory birds.
- Protect and restore the functions and natural processes of nearshore ecosystems in support of the natural resources of the reserve.
- Promote stewardship of riparian and aquatic habitats and species by providing education and outreach opportunities and promoting coordination with other resource managers.
- Support traditional recreational, commercial, and cultural uses in and adjacent to the site and promote responsible management of these uses in a manner consistent with the reserve goals.

The management plan will be reviewed and updated as necessary every ten years throughout the 90-year term of the reserve designation. Changes in site conditions of habitats and species, and existing uses of state-owned aquatic lands will be included in the updates. Research and monitoring results will be used to guide DNR in determining if management actions are meeting the goals and objectives of the reserves. If management actions are not supporting the objectives for the reserve, then they will be modified, monitored, and evaluated during the following 10-year review process in accordance with adaptive management strategies.

This plan is based on a collection of available research on aquatic resources at the site and over 18 months of public outreach. The interests expressed by the citizens of Vashon and Maury Islands, county and state government, the Puyallup Tribe, non-government organizations, and other groups and individuals to promote the conservation of aquatic resources and maintain the quality of life at the site guided the development of the plan.

2.0 Introduction

The DNR is directed by the Revised Code of Washington (RCW) to manage state-owned aquatic lands to provide a balance of public benefits that include encouraging public access, fostering water-dependent use, ensuring environmental protection, and utilizing renewable resources. In addition, the DNR is directed to generate revenue from state-owned aquatic lands when it is consistent with the other public benefits. The DNR is further authorized in RCW 79.10.210 and RCW 79.90.460(3) to manage the state's sensitive aquatic lands and to remove them when necessary from conflicting uses. As part of this authority, under Washington Administrative Code (WAC) 332-30-151 DNR can establish environmental, scientific, and education aquatic reserves. The reserve along the shores of Vashon and Maury Islands, was established as an environmental aquatic reserve in 2000, and confirmed as a reserve candidate in 2003, to conserve and enhance important habitats and species.

2.1 Statewide Aquatic Reserve Program Goals

The Non-Project Final Environmental Impact Statement Aquatic Reserves Program Guidance (EIS) (DNR 2002) specified that the goal of the Aquatic Reserve Program is to serve as a tool to help DNR ensure environmental protection, preservation, and enhancement on state-owned aquatic lands. While DNR manages for a balance of public benefits on all state-owned aquatic lands, the emphasis within reserves is on ensuring environmental protection. The other public benefits may take place within reserves, but they will be a lesser priority and may occur only if they meet the criteria established in this plan under Section 5.2.

2.2 Statewide Environmental Aquatic Reserve Objectives

The objectives specified in the programmatic EIS for environmental aquatic reserves include environmental protection, preservation, and enhancement of state-owned aquatic lands through: conservation of ecological functions; conservation of areas with cultural and historical significance; and enhancement with the goal of returning degraded systems to better functioning conditions. This plan outlines the site-specific goals and management strategies for the reserve.

2.3 Legal Authorities for Establishing Aquatic Reserves

The constitutional authority for the proprietary management on state-owned aquatic lands are derived from Articles XV and XVII of the Washington State Constitution. The Legislature delegated the responsibility for management of state-owned aquatic lands to DNR in RCW Chapter 79.90 through Chapter 79.96. The DNR's management of state - owned aquatic lands is governed by RCW Chapter 79.90 through Chapter 79.100 and certain provisions of RCW Chapter 79.01 through Chapter 79.80, RCW Chapter 43.12, RCW 43.30, and applicable WACs.

RCW 79.90.455 identifies environmental protection, the overarching goal of the Aquatic Reserve Program, as one of DNR's primary mandates for the management of state-owned aquatic lands. RCW 79.10.210 further authorizes DNR to identify and withdraw from all conflicting uses public lands that can be utilized for their natural ecological systems. WAC 332-30-151 directs DNR to consider lands with educational, scientific, and environmental values for aquatic reserve status, and identifies management guidelines for aquatic reserves. WAC 332-30-106(16) defines environmental reserves as sites of environmental importance, which are established for the continuance of environmental baseline monitoring and/or areas of historical, geological, or biological interest requiring special protective management.

2.4 Maury Island Environmental Aquatic Reserve Description and Location

The reserve is located in central Puget Sound and southwestern King County (see Appendix A for a legal description of the site). The reserve includes approximately 5,530 acres of state-owned aquatic bedlands and tidelands in Quartermaster Harbor and along the east and south shore of Maury Island, extending from Neill Point to the shores between Point Robinson and Luana Beach (Figure 1). The reserve consists mostly of subtidal areas, which are bedlands owned by the state. The state also owns approximately 12 percent of the intertidal areas (tidelands) of Quartermaster Harbor and the east side of Maury Island, which are also included within the reserve. The remainder of the tidelands adjacent to the reserve are not owned by the state and therefore are not included within the boundaries of the reserve (Figure 1). The reserve boundary extends waterward to a depth of 70 feet (21.4 meters) below mean lower low water, or one-half mile from the line of extreme low tide whichever is further waterward.

2.5 Purpose for Establishing the Maury Island Aquatic Reserve

Washington's marine ecosystems can be divided into three primary systems - the Columbia River Littoral Cell, the Olympic Coast, and the Georgia Basin, which includes Puget Sound (Ebbesmeyer et al. 1984). Nine sub-basins, based on oceanographic conditions, have been defined for the Georgia Basin, with the reserve located in the central Puget Sound sub-basin (Omernik and Gallant 1986). The reserve and its associated habitats and species are important components for conservation in the central Puget Sound sub-basin. The reserve was established for the conservation of several unique ecological features:

1. The boundaries of the reserve include nearly all of the known Quartermaster Harbor herring stock spawning grounds (Appendix G). These spawning grounds represent one of only 18 distinct Pacific herring spawning areas in Puget Sound. The reserve also includes a small portion of the herring stock's pre-spawning holding area.
2. The reserve contains Chinook salmon migratory corridors and rearing areas, bottom fish rearing habitat, and possibly bull trout migratory corridors.
3. Quartermaster Harbor was identified by the Audubon Society as an Important Bird Area and, in particular, an important area for wintering marine birds, especially western grebes.

4. Harbors and bays, the size of Quartermaster Harbor, are relatively uncommon in Puget Sound, and most have been heavily influenced by human development.
5. The reserve also includes the eastern shore of Maury Island. This area supports a unique, uninterrupted drift cell (area of mud, sand, or gravel material moved in the nearshore zone by waves and currents) that converges at Point Robinson with another drift cell along the northern shore of Maury Island (Appendix D). This convergence zone provides sediment to a sand spit located at Point Robinson. Drift along the south and east shore of Maury Island is northeast from Piner Point to the convergence zone at Point Robinson, with no reversals in direction. Such long, relatively uninterrupted drift cells are becoming a rare occurrence in the central Puget Sound region. These physical features are critical for the maintenance and development of accretional shore features. This drift cell feeds a minimally armored sand spit found at Point Robinson, which is also an increasingly uncommon occurrence within Puget Sound.
6. The reserve is unique within the central Puget Sound sub-basin because it has a diverse set of habitats and species that include extensive eelgrass beds, kelp beds, sand and mudflats, and herring, surf smelt, and sand lance spawning grounds.

2.6 Relationship to other Federal, State, Local, and Tribal Management

The reserve is located within the Puyallup Tribe's exclusive usual and accustomed fishing area. As such, it is essential that conservation goals and management activities be established to not conflict with the Puyallup Tribe's management and interests. The DNR will engage in a government-to-government dialog with the Puyallup Tribe to ensure that their treaty rights and trust responsibilities are upheld throughout the 90-year term of the reserve.

The successful management of the reserve will require coordination and collaboration with public and private entities at the local, state, federal, and tribal levels. The DNR will serve as the administrative lead for reserve management, but will seek active participation from other government and non-government entities listed in Appendix B. In the long-term, the DNR may seek to establish a management advisory group (which may consist of representatives from the groups identified in Appendix B) that focuses on local issues and management coordination for the reserve. In the short-term, management of the reserve will include attempts to coordinate and collaborate with the entities listed in Appendix B.

2.7 Planning Process

This management plan was developed in accordance with the State Environmental Policy Act (SEPA). The environmental impacts associated with the plan were evaluated in a Supplemental Environmental Impact Statement. The management plan shall serve as DNR's primary management guidance for the 90-year term of the reserve. Every ten years after the adoption of the plan, it shall be reviewed and updated with current scientific, management, and site-specific information. During the development of the original plan and each subsequent update, the DNR shall work with other jurisdictions, Tribes, interest groups, and local citizens to establish cooperative management actions for activities within and adjacent

to the reserve to conserve habitats and species within the reserve.

2.8 Management Actions Overview

The management plan addresses the following primary management actions:

- **Research and Monitoring:** DNR will emphasize the establishment of the baseline ecological conditions within the reserve, development of a monitoring database, and identification of the appropriate timing and methods for effectiveness monitoring. Effectiveness monitoring defined in Section 5.1.2 will help to evaluate the success of management actions in meeting the goals and objectives described in Section 3.0 for the reserve.
 - **DNR Management Guidance for Activities on State-Owned Aquatic Lands:** The aquatic reserve is located on state-owned aquatic lands managed by DNR and does not include private or other public tidelands or uplands adjacent to the reserve. Sections 5.2 and 5.3 define DNR's management strategies for activities that occur within the reserve. Management of the reserve will focus on activities that DNR has direct proprietary authority over, such as existing, pending, and proposed uses of state-owned aquatic lands.
 - **Activities on Private and Public Land Adjacent to the Reserve:** The DNR does not have regulatory or proprietary authority over private and public aquatic lands and uplands that are not owned by the State of Washington. Section 5.4 describes activities that adjacent landowners and managers may voluntarily consider to contribute to the success of the reserve.
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Figure 1: Maury Island Aquatic Reserve

For a color version of this figure see <http://www.dnr.wa.gov/htdocs/aqr/reserves/home.htm>



3.0 Maury Island Environmental Aquatic Reserve Goals and Objectives

The reserve was designated to conserve (preserve, restore, and/or enhance) the habitats and species that make the site unique. The proposed Maury Island Aquatic Reserve goals are broad statements of desired future condition. The DNR has formulated the following goals to conserve the critical habitats and associated species identified in Section 4.0 and Appendix C, including:

- I. Preserve, or restore and enhance where there are opportunities, native habitats and associated plant and wildlife species, with a special emphasis on forage fish, salmonids, and migratory birds.
- II. Preserve, or restore and enhance the functions and natural processes of nearshore ecosystems with a special emphasis in support of the natural resources of the reserve.
- III. Promote stewardship of riparian and aquatic habitats and species by providing education and outreach opportunities and promoting coordination with other resource managers.
- IV. Support traditional recreational (i.e., boating, water skiing, fishing), commercial (i.e., marinas), and cultural uses in and adjacent to the site and promote responsible management of these uses in a manner consistent with the other goals for the reserve.

In contrast, Aquatic Reserve objectives reflect what will be achieved to meet a particular goal. When possible, reserve objectives are intended to be specific, measurable, achievable, and results oriented. The proposed objectives are listed below as they apply to each of the reserve goals.

- I. **Preserve, or enhance where there are opportunities, native habitats and associated plant and wildlife species, with a special emphasis on forage fish, salmonids, and migratory birds.**

This goal will be achieved by:

- *Protecting fish spawning and rearing habitat and movement corridors.* Protect documented spawning and rearing areas from impacts associated with new developments on state-owned aquatic lands. Over time, eliminate the impacts associated with existing developments on state owned aquatic lands that affect ecological functions that support spawning and rearing habitat. Desired future conditions for forage fish habitat and salmon spawning, rearing, and migratory habitats are described in sections 4.5.8 and 4.5.9.
- *Identifying and minimizing sources of fish mortality resulting from human activities.* Continue monitoring efforts to identify interactions between fish and toxic materials, low dissolved oxygen conditions, and nutrients within the reserve. Wherever possible, eliminate sources of mortality resulting from human activities as they are identified.
- *Maintaining Clean Water Act standards for water and sediment quality.* Maintain water and sediment quality such that listing of waterbodies or segments within the

- reserve as impaired under the Clean Water Act is unnecessary. Desired future conditions for water and sediment quality are described in section 4.5.2.
- *Sustaining or increasing the documented extent and species composition of native aquatic vegetation.* A biomass index comprised of bed area and bed density will be established to reflect native kelp and eelgrass bed conditions at reserve establishment. The biomass index of eelgrass and kelp beds should not decrease due to anthropogenic impacts from the baseline level that reflect the area and density at reserve establishment. Desired future conditions for kelp and eelgrass beds are described in sections 4.5.6 and 4.5.7.
 - *Protecting and restoring intertidal sand and mudflats.* Maintain the total area of sand and mudflats documented to exist at the time the reserve is established. Desired future conditions for intertidal sand and mudflats are described in section 4.5.5.
 - *Preventing non-indigenous organisms from invading or disrupting the ecosystem.* Prevent non-indigenous species not already found within the reserve from establishing populations within the reserve. For those established non-indigenous species that have the capacity to disrupt the ecosystem, undertake appropriate management actions to reduce the abundance and threat to the ecosystem posed by the non-indigenous organisms.
 - *Protecting nearshore migratory bird habitat.* Maintain undisturbed shoreline habitats where birds can rest and feed during their annual winter migration. Desired future conditions for marine bird habitat are described in section 4.5.10.
 - *Support the recovery and protection efforts for Federal and State threatened and endangered species, species of special concern and their habitats.* Identify, monitor and protect all special-status plant and animal species found in the reserve, focusing on species that are state or federally listed, proposed for listing, or candidates for listing. DNR will work with WDFW, NOAA and USFWS to support recovery of Chinook salmon and bull trout, if present, by protecting and restoring suitable habitats within the reserve.

II. Protect and restore the functions and natural processes of nearshore ecosystems in support of the natural resources of the reserve.

This goal will be achieved by:

Maintaining the integrity and function of nearshore drift cell processes. Support voluntary efforts to reduce impacts of shoreline modification on nearshore drift cell processes. Target a reduction of shoreline hardening to less than 30 percent of the shorelines throughout the reserve. Support restoration projects that demonstrate ecological benefits and feasibility of shoreline softening to shoreline landowners. Desired future conditions for nearshore drift cells are described in section 4.5.3.

- *Protecting and restoring hydrologic functions and water quality of stream mouth estuaries.* Support efforts to maintain natural flow regimes in streams and seeps

entering the reserve. Desired future conditions for stream mouth estuaries are described in section 4.5.4.

- *Working cooperatively to identify and minimize existing and potential future impacts on the nearshore environment resulting from outfalls and runoff discharging to the reserve.* Monitor nearshore water quality for signs of impairment resulting from outfalls or runoff discharging to the reserve. Support local efforts to manage and treat stormwater, sewage, and gray water discharging to the reserve.

III. Promote stewardship of riparian and aquatic habitats and species by providing education and outreach opportunities and promoting coordination with other resource managers.

This goal will be achieved by:

- *Promoting voluntary habitat conservation efforts within and adjacent to the reserve.* Provide trainings and educational materials to shoreline owners describing conservation benefits, best practices, and conservation incentive programs. Establish relationships with local stakeholders to support the reserve's function in providing ecosystem services to the local community.
- *Creating opportunities for public involvement in the management of the reserve.* Create and distribute annual summaries of reserve related activities, achievements and programs. Form and support diverse, stakeholder-based groups to give meaningful, timely input to the DNR regarding the Maury Island Aquatic Reserve.
- *Supporting scientific research and education related to management of the reserve through identifying and prioritizing research needs in relation to the goals identified in this section.* The reserve will work with other agencies and organizations to provide assistance to other programs by designing, conducting, or hosting at least one regionally based environmental education field trip, workshop, seminar, or study course each year. Partner with educational groups to develop and post interpretative materials describing natural resources found within the reserve.

IV. Support traditional recreational (i.e., boating, water skiing, fishing), commercial (i.e., marinas), and cultural uses in and adjacent to the site and promote responsible management of these uses in a manner consistent with the other goals for the reserve.

This goal will be achieved by:

- *Working in cooperation with lessees and recreational user groups to minimize and reduce identified impacts of human activities on the species and habitats within the reserve.* The DNR will take a leadership role in developing and strengthening partnerships, including working with volunteers, and will conduct a variety of outreach efforts to more effectively achieve reserve goals and contribution to the protection and enhancement of the aquatic ecosystems of Vashon and Maury islands.

- *Fostering public access to state-owned aquatic lands within the reserve in a manner consistent with the other management goals for the site.* Work with partners to provide safe and attractive opportunities to access public lands within and adjacent to the reserve. The reserve will provide a variety of quality boat and bank interactions with aquatic resources that are safe, consistent with state regulations, and compatible with reserve resources and purposes.
 - *Supporting the integrity of adjacent archaeological, cultural, or historical sites.* The reserve will promote a deeper appreciation and understanding of the archaeological, cultural, and historical sites adjacent to the reserve. Desired future conditions for archaeological, cultural, and historical resources are described in section 4.5.11.
-

4.0 Reserve Resource Descriptions

A detailed description of natural resources found within and adjacent to the reserve is provided in Appendix C. This section includes a brief overview of the distinctive ecological zones, habitats, species, and archaeological, cultural, and historical resources found within or adjacent to the reserve and their desired future conditions. The desired future conditions represent the goal for the resource and the proposed activities for achieving these conditions.

Natural resource descriptions summarized here and provided in Appendix C benefit from research associated with a Quartermaster Harbor Marine Park Study completed in 1975, research associated with development proposals for the Piner Point – Point Robinson nearshore, and other available sources. However, there are gaps in the scientific understanding of the distribution and abundance of many natural resources in this reserve. Research and monitoring described in Section 5.1 of this document will allow DNR to minimize these gaps and adopt more specific management actions for the reserve.

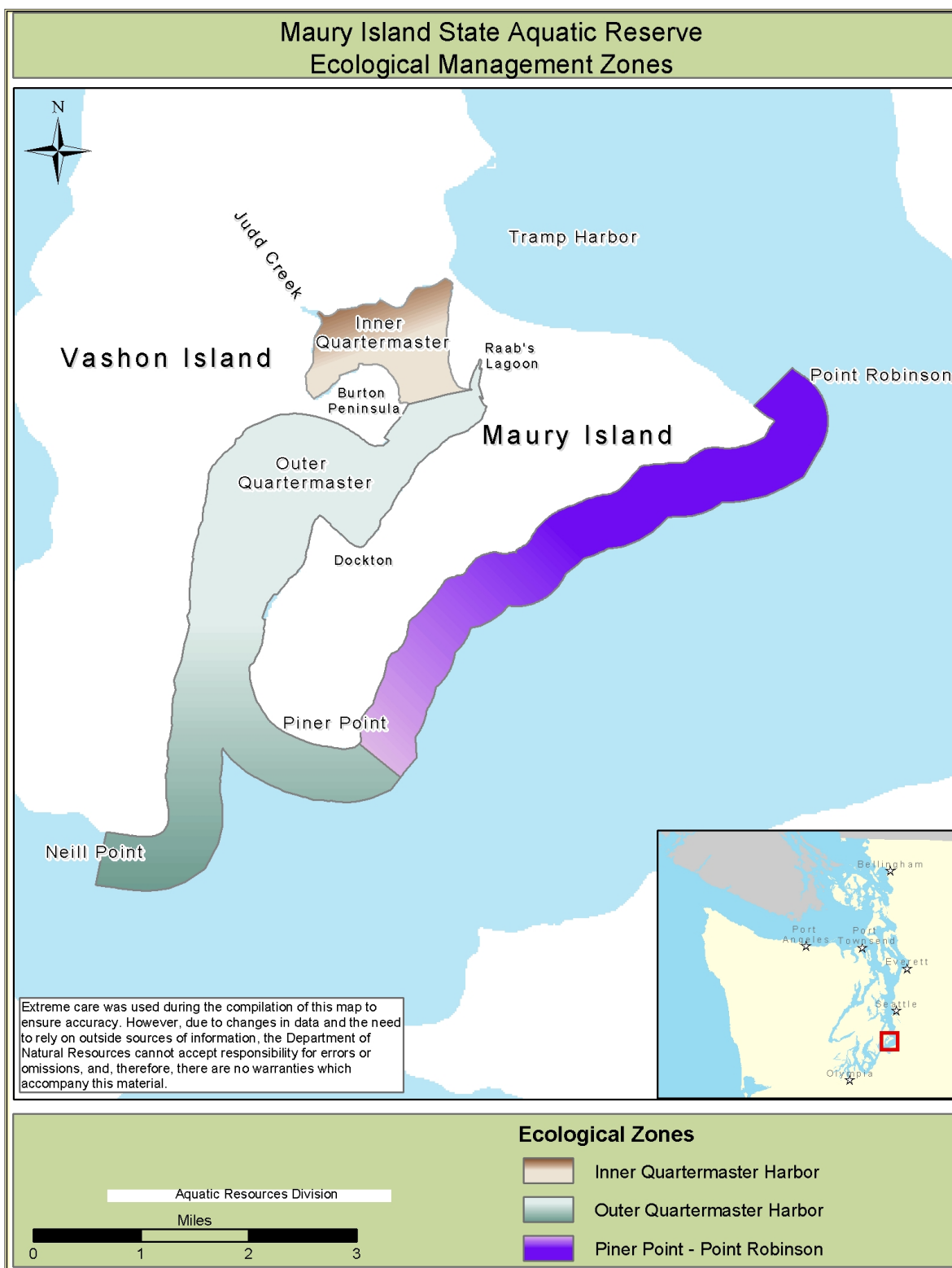
4.1 Ecological Zones

The reserve is divided into three distinct ecological zones (Figure 2), each with substantial differences in the associated natural resources, ecological processes, and management needs. The following management units have been established for the reserve:

1. Inner Quartermaster Harbor: Inner Quartermaster Harbor is the most protected portion of the harbor with very weak or indeterminate currents created by tide and wind conditions (Turnbeaugh 1975). The subtidal sediments in this area are classified as mud, but the mud is much deeper than areas in outer Quartermaster Harbor (Blau 1975).
 2. Outer Quartermaster Harbor: The delineation between inner and outer Quartermaster Harbor is the transition area between Burton Peninsula and Raab's Lagoon (Figure 2). With the exception of the area around Dockton, outer Quartermaster Harbor experiences much higher wave exposure, currents, and circulation. The waters in inner and outer Quartermaster Harbor are warmer, less saline, and have a higher residency time than waters offshore of Maury Island's east shore.
 3. Piner Point - Point Robinson Nearshore (also referred to as the east shore of Maury Island). The east shoreline of Maury Island from Piner Point to Point Robinson are much more exposed and transition to deeper offshore waters. Nearshore currents direct sediment movement towards the northeast, supporting the sand spit known as Point Robinson.
-

Figure 2: Ecologic Management Zones

For a color version of this figure see <http://www.dnr.wa.gov/htdocs/aqr/reserves/home.htm>



4.2 Habitats

Quartermaster Harbor is a relatively shallow, protected embayment between Vashon and Maury Islands. The eastern shoreline of Maury Island includes a high-energy marine shoreline that extends from the mouth of Quartermaster Harbor north to Point Robinson. Significant habitats in the reserve include: extensive eelgrass (*Zostera marina*); kelp beds (*Laminaria saccharina* and *Nereocystis leutkiana*); a relatively uninterrupted drift cell along the east shore of Maury Island moving northeast to Point Robinson; a sand spit at Point Robinson; and other sand and mudflats. Transition zones between freshwater surface flows and the marine waters of the reserve include the estuaries at the mouth of Judd Creek, Fisher Creek, and Raab's Lagoon. Numerous smaller streams and seeps deliver freshwater to Quartermaster Harbor and Maury Island's east shoreline and can have large seasonal effects on habitat conditions.

4.3 Species

While fish and wildlife populations have not been thoroughly inventoried, the reserve appears to support a high level of biodiversity. Compared to urban bays in central Puget Sound, Quartermaster Harbor supports a larger diversity of fish and invertebrates. Studies of fish species found in both Puget Sound urban bays and Quartermaster Harbor reveal that the fish within Quartermaster Harbor were significantly larger in size. Fish species found in Quartermaster that are absent from urban bays include: Spiny dogfish, spotted ratfish, longnose skate, rock sole, starry flounder, speckled sanddab, pile surfperch, striped surfperch, bay goby, blackbelly eelpout, bay pipefish, and plainfin midshipman (Gibson et al. 2000).

Species lists (Appendix C) for Vashon and Maury Island suggests that 78 bird species associated with marine or shoreline habitats are found on the islands (Blau 1975). The highest occurrences and diversity of bird species are found in Quartermaster Harbor during winter and occur at much lower levels or are absent during the rest of the year. Marine mammals that visit the reserve include river otters, harbor seals, and less frequently killer whales, harbor porpoises and California sea lions. Regionally important species or populations and associated habitats of interest within the reserve include: forage fish spawning grounds, including herring, surf smelt and sand lance; salmonid (i.e., Chinook, coho, chum, steelhead, cutthroat) rearing areas and migratory corridors, bottom fish rearing habitat, and an important wintering ground for migratory marine birds including western grebes. Herring spawning grounds and western grebe wintering grounds of the quality found within the reserve are not replicated anywhere else in the central Puget Sound sub-basin.

4.4 Archaeological, Cultural, and Historical Resources

The following sites of archaeological, cultural, and/or historical importance have been identified adjacent to the reserve boundaries, on private or public uplands and tidelands (no sites have been identified inside the reserve):

- Point Robinson Lighthouse: Located at the northeast corner of Maury Island, the Point Robinson Lighthouse is on the National Register of Historic Places. The lighthouse was originally constructed as a fog signal in 1885, but was rebuilt to current conditions in 1915.
- Historical portage from the northeast corner of Quartermaster Harbor to the Puget Sound: The historical portage site is not registered on a historic register. During the period when the portage was still submerged at high tide, the area was a favorite fishing and hunting ground of the Nisqually people. Nets in this area were used to capture abundant waterfowl (Larkin 1975).
- Historic Clam Middens: Clam middens were excavated on the north shore of the Burton Peninsula within Quartermaster Harbor in 1996 by University of Washington's Department of Archaeology (Joseph 1996).

4.5 Desired Future Conditions of Reserve Resources

This section identifies the desired future conditions for each of the resources targeted for conservation in the reserve. Each resource is described in greater detail in Appendix C. Desired future conditions represent the goal for the resources in the future and include proposed activities for achieving these desired conditions. Details of management activities can be found in Section 5.0.

4.5.1 Physical Resources

An objective of reserve management is to decrease shoreline hardening on state owned aquatic lands and, through volunteer cooperation, on adjacent private and public lands to less than 30 percent within and around the reserve during the 90-year term of the reserve.

4.5.2 Water and Sediment Quality

The interim desired future conditions for water and sediment quality within the reserve include: 1) Improve the water and sediment quality to a level in which no areas within the reserve are closed to recreational shellfish harvesting by the WDOH due to health concerns; and 2) Meet clean water act standards for water and sediment quality. While preliminary threats to water and sediment quality have been identified, additional work needs to be done to document both their extent and sources. As a result, DNR currently has not determined the exact level of improvement in water or sediment quality needed to achieve these two interim goals. The long-term desired future conditions for water and

sediment quality will be adjusted and refined as DNR gains information through the applicable research and monitoring identified in Section 5.1.

4.5.3 Nearshore Drift Cells

Waves typically approach the shore at an angle, creating longshore currents and moving sediments by a process call nearshore (littoral) drift. A simple example is sand built up on one side of a fallen tree or boat ramp and eroded on the other. Shorelines develop discrete neashore drift cells, which are bounded by headlands, or rock outcroppings that provide a barrier to the continued flow of sediment along the shore. These cells may be several mile in length, or just a few hundred feet. A littoral cell includes a source area for beach sediment, such as a stream mouth or eroding bluff, and an area where sediment accumulates, typically a low-lying sand spit or barrier beach.

Nearshore drift cells (Appendix D) are an important component of shoreline environments and shall be preserved, restored, and enhanced throughout the reserve. Quantifiable goals for this resource will be established after inventory activities in Section 5.1.1 are completed.

Nearshore drift occurs in intertidal and subtidal areas of the nearshore. The subtidal portions of seven drift cells are included in the reserve. The majority (88 percent) of the shoreward portion of the drift cells lies on privately owned tidelands. As such, the DNR will rely on voluntary stewardship actions on private lands to maintain and improve nearshore drift cells by promoting land use practices that provide for uninterrupted sediment flow, while protecting private property. Management of activities on state-owned aquatic lands will also rely on recognized cause and effect relationships of proposed activities to avoid and minimize potential adverse impacts on nearshore drift cells.

4.5.4 Stream Mouth Estuaries

There are at least 36 freshwater seasonal or perennial streams that flow into the reserve (Appendix E). Existing knowledge regarding the status of estuaries within the reserve is not sufficient to identify specific goals for this resource. In the long-term, DNR will attempt to protect, restore, and enhance the existing conditions of stream mouth estuaries while deferring quantifiable goals until the research inventory in Section 5.1.1 is completed. In the interim, DNR will identify sources of surface freshwater entering the reserve and work cooperatively with private and government entities to ensure that freshwater sources maintain their natural hydrologic functions and minimize inputs of point and non-point source pollutants that may adversely impact the habitats and species within the reserve.

4.5.5 Intertidal Sand and Mudflats

In the long-term, the DNR will seek to ensure that the sand and mudflat areas within the reserve are functioning adequately to support their habitat values. Since the level of function of these habitats in the reserve is currently not known, an interim goal is to protect the existing sand and mudflat areas within the reserve until their functions have been studied. The quantifiable, long-term goals for this resource will be established after activities in Section 5.1.1 are completed. In the interim, management of activities will rely on recognized cause and effect relationships of proposed activities to avoid and minimize potential adverse impacts on sand and mudflat habitats.

4.5.6 Eelgrass

Shoreline surveys found continuous or patchy eelgrass beds offshore of 78 percent (18.65 of 23.88 miles) of the shoreline within the reserve (Appendix F). Existing knowledge regarding the status of eelgrass within the reserve is not sufficient to identify long-term, quantifiable goals. In the interim, DNR will rely on recognized cause and effect relationships of proposed activities to preserve, restore, and enhance the existing eelgrass beds within the reserve (with the goal of achieving no net-loss of eelgrass) and defer quantifiable goal setting until the inventory identified in Section 5.1.1 is completed.

4.5.7 Kelp

There is no evidence of continuous kelp beds within the proposed reserve, but patchy distributions have been reported along the western and eastern shorelines of Maury Island (Appendix F). The existing knowledge regarding the extent and status of kelp within the reserve is not sufficient to identify long-term, quantifiable goals. In the interim, DNR will rely on recognized cause and effect relationships of proposed activities to preserve, restore, and enhance the existing kelp within the reserve (with the goal of achieving no net-loss of kelp) and defer quantifiable goal setting until the inventory identified in Section 5.1.1 is completed.

4.5.8 Forage Fish Habitat

Over the 90-year period of the reserve designation, DNR will seek to ensure that both the quantity and quality of forage fish rearing and spawning habitat (Appendix G) within the reserve is not diminished and look for opportunities for improvements. Baseline inventories specified in Section 5.1.1 will be an integral part of quantifying this goal. In the interim, the DNR will work on a site-by-site, project-by-project basis to quantify this habitat and ensure its protection and improvement. Herring spawn throughout Quartermaster Harbor and along the southeast shoreline of Maury Island. There is only one documented area of sand lance spawning habitat representing approximately 0.3 miles of shoreline habitat within the reserve. There are 5.71 miles of documented surf smelt spawning beaches (primarily) adjacent to the reserve.

4.5.9 Salmonid Spawning, Rearing, and Migratory Habitat

Although DNR has no management authority over the salmonid spawning streams in the area, it is DNR's goal to protect and improve conditions of the streams and nearshore areas through cooperative efforts. The DNR will rely on recognized cause and effect relationships of proposed activities to preserve, restore, and enhance existing levels of salmonid rearing and migratory habitat within the reserve. Quantification of desired future conditions for salmonid habitat is deferred until the conclusion of the inventory specified in Section 5.1.1. In the interim, DNR will work on a site-by-site, project-by-project basis to quantify this habitat and ensure its protection and improvement.

4.5.10 Marine Bird Habitat

Aside from specific areas with substantial human development (i.e., Gold Beach, Sandy Shores, Dockton, and Burton), the areas adjacent to the reserve have riparian habitat that is largely intact and supports a number of bird populations, both seasonal and resident. The DNR does not have management authority over human development activities on private property adjacent to the reserve, which is where much of the bird habitat in the area exists (Appendix H). However, DNR's goal is to protect and improve the existing bird habitat through cooperative efforts with adjacent landowners, King County, and the Washington Department of Fish and Wildlife (WDFW). The DNR's ultimate goal is to sustain habitat that supports important bird populations in the area through existing regulatory and conservation efforts.

4.5.11 Archaeological, Cultural, and Historical Resources

The DNR does not have management authority over the geographic areas that contain archaeological, cultural, or historical resources near the reserve. The DNR will rely on the Washington State Office of Archaeology and Historic Preservation, Puyallup Tribe, and local knowledge and interest in these sites to dictate their future management. The DNR goal is that activities within the aquatic reserve cause no harm to the archaeological, cultural, or historical resources near the reserve.

5.0 Aquatic Reserve Management

The reserve management plan can be divided into three primary categories of activities:

- Research and monitoring activities within the reserve (Section 5.1);
- Management guidance for existing and future activities by DNR on state-owned aquatic lands (Section 5.2); and
- Voluntary stewardship activities on private property and public lands adjacent to the aquatic reserve (Section 5.3).

Since most of the long-term goals and management strategies for the reserve depend on understanding the baseline ecological conditions within the site, a major emphasis during the first ten years of reserve designation will be placed on establishing these baseline conditions (Section 5.1.1). After baseline conditions are determined for resources, specific quantifiable goals will be developed and incorporated into the management plan. During this same period, management of the site will also focus on activities that DNR has direct proprietary authority over, such as existing, pending, and proposed uses of state-owned aquatic lands.

Since impacts to sensitive habitats and species within the reserve may also be attributed to activities that DNR does not have explicit authority to manage, DNR will seek management cooperation and collaboration from other public and private entities, specifically local governments and citizens. The DNR will work cooperatively with the Washington Department of Ecology, WDFW, and King County to incorporate relevant best management practices (BMPs) into the management of the reserve.

5.1 Research and Monitoring

There are three components to research and monitoring within the reserve:

- Establishing baseline conditions;
- Monitoring to determine the effectiveness of management activities and document natural variation; and
- Researching, to better understand observed changes and the interaction between management activities and natural resource conditions.

5.1.1 Establishing Baseline Conditions

Baseline monitoring will document current conditions by combining existing research with inventories of resources and ecological processes that are not adequately documented. Understanding baseline conditions is important to the development and implementation of the management plan; therefore, establishing baseline conditions will be emphasized immediately after reserve designation. The reserve has been included in several survey efforts associated with the Puget Sound Ambient Monitoring Program. Additionally, regional surveys have included monitoring sites within or adjacent to the reserve for bottom

fish abundance, paralytic shellfish poisoning (Determan 2003b), and marine birds, as well as nearshore fish community studies, and shoreline inventories (Bloch et al. 2002). However, considerable gaps exist in our understanding of ecological processes and the distribution and abundance of natural resources within the aquatic reserve. As our understanding of ecological processes and natural resources improves, management activities can be further refined and targeted.

To address these needs, a thorough inventory of the resources present will be undertaken during the first ten years of reserve status. Natural resources and ecological processes will be inventoried, including the biological, chemical, and physical components of the reserve, on both a multi-year and multi-season schedule. Timelines and sampling protocols will be established for gathering this information. The description of baseline conditions will form the basis for future goal determination, adaptive management, change detection, and assessment of the benefits accrued from management activities associated with the reserve. The DNR will seek to partner with the Washington Department of Ecology, WDFW, the King County Department of Natural Resources, and local community groups to coordinate baseline inventory efforts.

After baseline ecological conditions are identified, specific management actions will be refined following an adaptive management process (Section 6.0). Quantifiable management goals and actions will be developed and adjusted over time based upon the established baseline conditions to aid in attaining the desired long-term future conditions for the resources of the aquatic reserve (Section 4.5).

5.1.2 Monitoring for Effectiveness

The purpose of effectiveness monitoring is to assess the success of management actions in attaining or exceeding the goals delineated in Section 3.0. Effectiveness monitoring will be used to report to the public and DNR on the patterns and conditions of natural resources at the Maury Island site over time. In addition to annual updates and activity reports, effectiveness monitoring results will be compiled in a monitoring report that will evaluate management effectiveness once every five years. The DNR will also develop a monitoring database to coordinate and compile the data collected by DNR and other entities during ongoing monitoring activities within and adjacent to the reserve.

5.1.3 Research

The DNR will seek to partner with the Washington Department of Ecology, WDFW, the King County Department of Natural Resources, academic scientists, and local community groups to identify and develop research projects within the reserve.

Possible research topics include:

- Identifying and developing remediation plans for sources of observed herring egg mortality in the vicinity of Dockton.
- Prioritizing areas and approaches for shoreline softening to benefit migrating salmonids, forage fish, and wintering birds.
- Identifying historic conditions and ecological functions of important ecosystem components such as Judd Creek, “portage,” Fisher Creek, Point Robinson, and Raab’s Lagoon.
- Identifying socioeconomic incentives for private preservation, restoration, and enhancement within and around the aquatic reserve.
- Determining the ecological connectivity of this site to other protected areas throughout Puget Sound.
- Describing nearshore habitat use by salmonids, and the role of nearshore habitat corridors in the development of salmonids.
- Identifying and describing relationships between riparian and upland conditions and marine nearshore ecological function.
- Examining the potential impacts and benefits of re-establishing the connection at “portage” between Quartermaster Harbor and Tramp Harbor.

A long-term research goal will be to provide resource managers with information that accurately describes the effects of management actions on the ecological processes and natural resources of the reserve.

5.2 Management Guidance for Existing and Future Use Authorizations

Uses of state-owned aquatic lands take many forms and involve a diversity of activities. DNR employs different forms of use authorizations (i.e., rights-of-entry, licenses, leases, and easements) to authorize activities such as marinas, piers, public access sites, utility crossings, outfalls, and a variety of other uses. The proper management of activities within the reserve will be a critical component of DNR’s overall strategy for the reserve as WAC 332-30-151(2) states that “leases for activities in conflict with reserve status shall not be issued.”

Proposals for pending, new, or a continuation of existing uses within the reserve will be evaluated by DNR using the guidance in this section in consideration of the relationship between the potential impacts of the proposed activities and the existing habitats and species of the site. In addition, any activity proposed within the reserve must obtain all required state, local and federal permits for the project prior to final DNR authorization. The focus of management will be on avoiding cumulative, long-term effects to the reserve habitats, species, and ecological processes. For those existing uses within the reserve, discussed in Section 5.2.3, the management emphasis will be to reduce their existing impacts over the 90-year time frame of the reserve. The reduction and elimination of impacts to the natural

environment will be implemented using available and reasonable technologies as the remaining economic life of any existing structure is realized or there are expansions or upgrades to a facility. New and expanding activities will be managed according to the general management strategies described in Sections 5.2.1 and 5.2.2. The determination of whether new, expanding, or continuation of existing activities support the objectives of the reserve will be made based on a case-by-case evaluation.

Section 5.2 identifies three “screens” that DNR will use to determine if uses are appropriate in the reserve:

- General programmatic principles (Section 5.2.1);
- General management strategies for specified uses (Section 5.2.2); and
- Specific management strategies for currently authorized uses or pending use applications (Section 5.2.3).

These screens essentially serve as an interpretive statement of WAC 332-30-151(2) regarding activities that are in conflict with the reserve. Each proposal for pending, new, or a continuation of existing uses within the reserve will be evaluated using these screens.

5.2.1 General Programmatic Principles

First, to meet the purpose of the reserve program and achieve the specific goals and objectives for the reserve, the basic principles below will be applied by DNR for existing, pending, and future proposed use authorizations within the reserve. The activities must:

- Primarily serve the objective of the reserve;
- Reduce site-specific impacts over time;
- Monitor impacts; and
- Apply adaptive management strategies.

5.2.1.1 Primarily Serve the Objective of the Reserve

In general, the DNR issues use authorizations throughout Washington State for water-dependent uses, non-water dependent uses, public use and access, natural resource extraction, revenue generation, and environmental protection. The lease activities within the reserve must primarily serve the objective of the reserve designation. Since the objective of the reserve is environmental protection, lease activities within the reserve must primarily serve to protect the environment (i.e., engage or support conservation activities). A lease activity will be considered to primarily serve the objective of the reserve if it meets the conditions below.

- The lease activity does not create additional reserve-wide or localized temporal or spatial loss of reserve habitats, species, or ecological processes identified for conservation. The DNR will only permit new or expansion of existing activities within the reserve that do not adversely affect the ability of

site managers to achieve the goals detailed in Section 3.0. In general, no net loss—in time or space—of natural resources identified for conservation in Section 4.0 and Appendix C will be permitted. The primary emphasis will be placed on avoidance and minimization to eliminate the need for compensatory mitigation. New and expanding activities proposed for the reserve will not be permitted if they do not first avoid and minimize all possible impacts. Any remaining short or long-term impacts must then be fully compensated for. In cases where compensatory mitigation is required to offset impacts, the habitat improvement or activity proposed for compensatory mitigation must be implemented and/or constructed prior to construction of the proposed (impacting) project.

- All lease activities within the reserve must also implement conservation actions in support of the desired future conditions described in Section 4.5. The conservation activities must be proportionate to the type of activity and the area encumbered by a lease. Environmental conservation activities may include, but are not limited to, direct implementation of, or funding for implementation of management activities that are identified within this plan, such as:
- Monitoring and scientific research identified in Section 5.1;
- Habitat improvement, land acquisition, long-term management and maintenance, or reduction of spatial impacts of existing uses consistent with the desired future conditions for the reserve identified in Section 4.0;
- Education and outreach identified in Section 5.3.5; and
- Reduction of existing or potential threats to habitats and species identified in Section 4.0 and Appendix C.

The project proponent, in consultation with DNR staff, will be responsible for demonstrating the temporal and spatial scope of the environmental benefit that would result from an applicant's proposed activities. Factors for determining equitable environmental benefits for an activity will include, but not be limited to, the following:

- Size of the area;
- Intensity and frequency of use;
- Location of activity in relation to specific habitat and species use; and
- Exclusivity of use (the level at which other activities are precluded in the area).

5.2.1.2 Reduce Impacts Over Time

For existing uses in Section 5.2.3, site management plans must be developed and implemented cooperatively between DNR and project proponents. The site plan must identify measures that will reduce site-specific environmental impacts from existing

facilities and uses over time based on recognized cause and effect relationships of these activities. The management emphasis for an existing activity or facility will be to reduce their existing impacts over the 90-year time frame of the reserve. The reduction of impacts of a facility will be implemented as the remaining economic life of the existing structure is realized or there are expansion or upgrades to the facility.

5.2.1.3 Monitor Impacts

Plans must be developed and implemented by project proponents to monitor potential environmental impacts from existing and proposed activities.

5.2.1.4 Apply Adaptive Management

Adaptive management strategies must be developed and implemented by project proponents to ensure improved operations and reduced environmental impacts over time.

5.2.2 General Management Strategies for Uses

New activities proposed within the reserve will be evaluated based on their potential environmental impacts relative to the ecologic zone in which the activity is proposed (Section 4.1). The following section discusses the impacts that are likely associated with each type of activity and management strategies that DNR will employ to address these issues. Appendix O includes a matrix summarizing the management strategies for the various activities discussed in this section.

5.2.2.1 Stormwater Outfalls

Description: Stormwater is often collected in either pipes or ditch systems for discharge into surrounding waterways. Such systems prevent upland areas from being impacted by most rainfall events. Stormwater is often collected in a settling pond or infiltration area prior to discharge to receiving waters.

Environmental Impacts: Stormwater collects nutrients and toxics from the surfaces of streets, agricultural, industrial, and residential properties. Stormwater that is discharged directly into an outfall without any treatment may contain considerable quantities of nutrients, toxics, and sediment, and this discharge may affect the flow, chemistry, mixing, and temperature of receiving waters. Stormwater temperature may be artificially elevated if shallow detention ponds are used or if water is collected off of surface streets. The discharge of stormwater into the receiving waters may cause a localized decrease in salinity levels, and biological activity resulting from nutrient inputs may result in depressed dissolved oxygen (DO) levels (Figure 3).

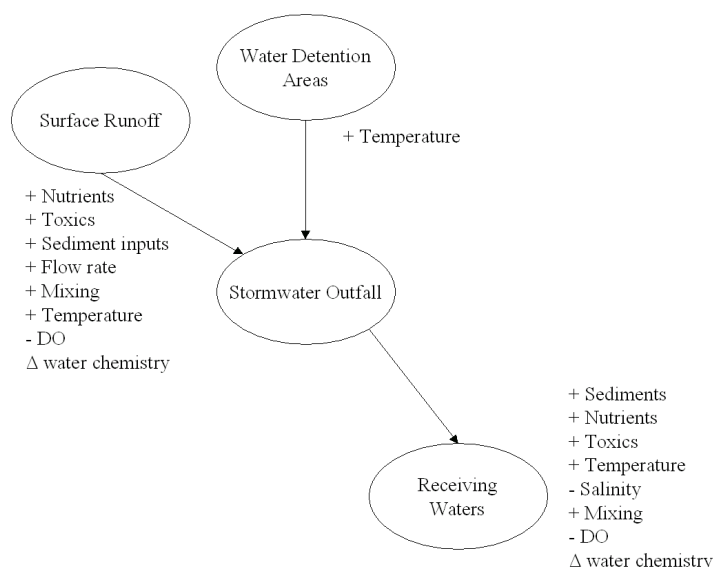


Figure 3: Conceptual diagram of relationship between stormwater outfalls and impacts to the natural environment.

Management Strategy: Areas in inner and outer Quartermaster Harbor lack sufficient depth or mixing to incorporate direct stormwater inputs without causing impacts to habitats and species. As a result, outfalls on state-owned aquatic lands in these areas will not normally be allowed as they are in conflict with the reserve. Along the area from Piner Point to Point Robinson, DNR would prefer no direct discharge to the reserve area. Upland treatment and infiltration to groundwater, streams, or wetlands, thereby allowing freshwater to be re-introduced to marine waters through natural hydrologic processes is preferred for all areas of the reserve. The DNR may consider a discharge if the area of impact extends beyond the reserve boundary and does not affect species or habitats of concern (eelgrass, herring holding area, salmon migratory habitat, nearshore zone).

5.2.2.2 Sewage Outfalls

Description: Sewage is collected at a central location for treatment. Treated wastewater is discharged through a pipe to receiving waters.

Environmental Impacts: Municipal wastewater is usually permitted to discharge elevated amounts of nutrients, minerals, and freshwater to receiving waters for dilution. Impacts in the “dilution zone” include increases in ambient water temperatures, salinity, fecal coliform bacteria, phosphorus, nitrogen, other pollutants, diminished dissolved oxygen levels in the receiving waters, and potential localized sediment contamination (Figure 4).

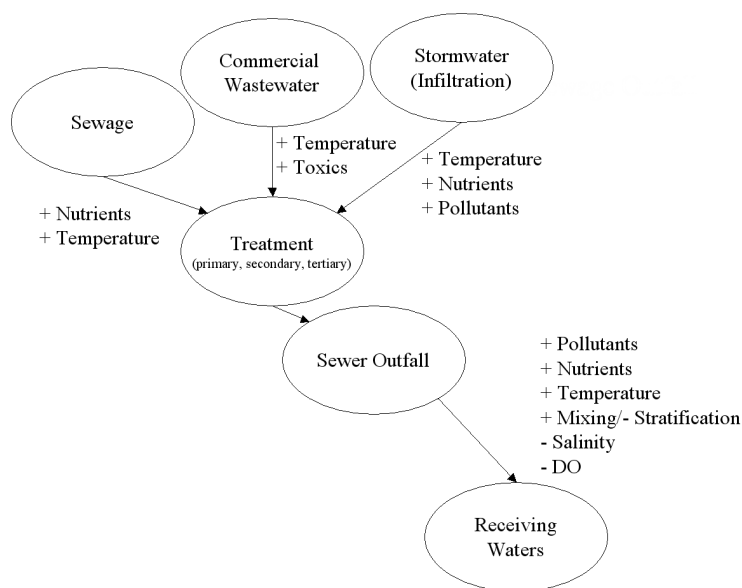


Figure 4: Conceptual diagram of relationship between sewer outfalls and impacts to the natural environment.

Management Strategy: Areas in inner and outer Quatermaster Harbor lack sufficient depth or mixing to incorporate municipal wastewater inputs without environmental impacts. As a result, outfalls on state-owned aquatic lands in these areas will not normally be allowed as they are in conflict with the reserve. Along the area from Piner Point to Point Robinson, DNR would prefer no direct discharge to the reserve area. Upland treatment and infiltration to groundwater, streams, or wetlands, thereby allowing freshwater to be re-introduced to marine waters through natural hydrologic processes is preferred for all areas of the reserve. The DNR may consider a discharge if the area of impact extends beyond the reserve boundary and does not affect species or habitats of concern (eelgrass, herring holding area, salmon migratory habitat, nearshore zone).

5.2.2.3 Water Intakes

Description: A water intake is a mechanism for withdrawing water, usually through a pipe, from a waterbody for industrial, municipal, or private uses. Marine water intakes can be used to supply marine water for aquaria, cooling, desalinization, or industrial uses.

Environmental Impacts: The intake of marine water can result in impacts to localized habitat (due to the intake pipe), mortalities to fish and fish larvae, disruption of larval dispersal, and entrainment of marine species (Figure 5).

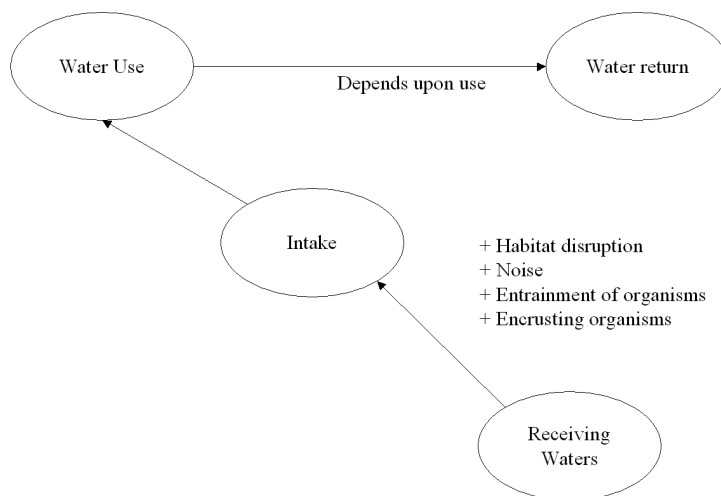


Figure 5: Conceptual diagram of relationship between intakes and impacts to the natural environment.

Management Strategy: No intakes will be allowed near fish spawning, migratory, or rearing areas as this would be in conflict with the reserve. Intakes should be placed deeper than –30 feet MLLW along the east shore of Maury Island and will not be permitted in Quartermaster Harbor. Intake design must adhere to WDFW screening requirements.

5.2.2.4 Desalinization Facilities

Description: Desalinization of seawater can be done in two ways. Both require the withdrawal of seawater through a seawater intake as described in section 5.2.2.3. One desalinization method uses distillation and the other uses osmosis. Both of these systems require external power sources to operate. In distillation, the water is boiled and the steam produced is channeled off so that it cools and recondenses and is collected as freshwater. Impurities, including salt, are left behind in the boiling chamber. Osmosis employs a filter membrane that allows pumped water to pass through it, but not impurities. Rates of desalinization of water will depend on the size of the operation, the rate of pumping, and the capacity of the system for the collection of impurities before it needs to be cleaned.

Environmental Impacts: Impacts associated with desalinization facilities will include those identified for intakes (Section 5.2.2.3). In addition, desalinization facility wastewater is very high in salinity (compared to receiving waters) and contains other impurities that are byproducts of the process. This waste stream is usually discharged into marine receiving waters. Disposal of this waste water could alter the habitat and species use in the area of influence of the outfall disposal pipe (Figure 6).

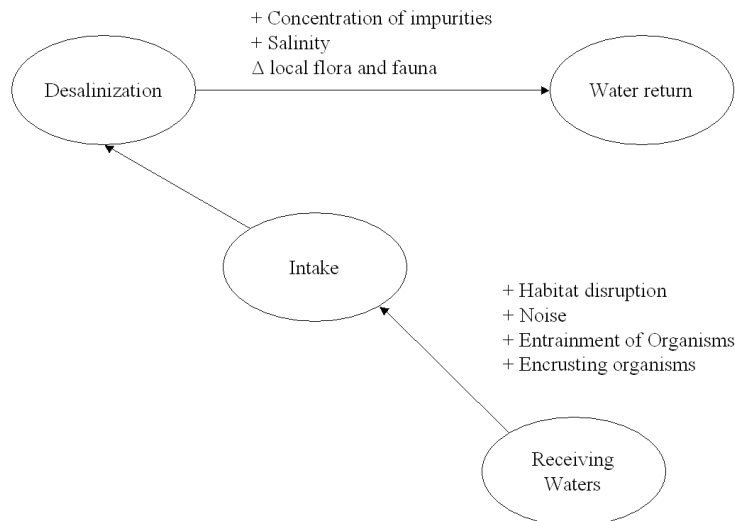


Figure 6: Conceptual diagram of relationship between a desalinization facility and impacts to the natural environment.

Management Strategy: Management strategies for the intakes associated with desalinization facilities are described in Section 5.2.2.3. Until the impacts associated with desalinization facilities on receiving waters are understood, the discharge of desalinization wastewater to marine waters will not be allowed within inner or outer Quartermaster Harbor. The DNR would prefer no direct discharge to reserve area along the area from Piner Point to Point Robinson. The DNR may consider a discharge area of impact that extends beyond the reserve boundary and does not affect species or habitats of concern (eelgrass, herring holding area, salmon migratory habitat, and shellfish).

5.2.2.5 Cable Crossings (Telecommunications and Power lines)

Description: Cable crossings are frequently needed to provide power, phone, or other entertainment or communication services to island or coastal communities.

Environmental Impacts: Construction of a cable crossing involves the drilling, burial or laying of a cable. Impacts that are likely to be associated with cable crossings include construction-related increases in turbidity, habitat disturbance, and increases in noise levels (Figure 7). The small profile of most cable crossings means that there are few documented, long-term environmental impacts associated with a cable once it is installed. Appropriate selection of installation methods and cable right-of-way can avoid many environmental impacts and minimize those associated with construction. These impacts are most likely to affect aquatic vegetation and migratory fish and wildlife. Some older electricity cables may be fluid-filled and therefore may leak lubricants if damaged. These lubricants can have long lasting, toxic impacts on the

natural environment. Cables laid on the top of the seafloor may create localized seafloor scouring after installation and have a higher risk of damage due to anchor drag or marine debris due to their exposure (Figure 7).

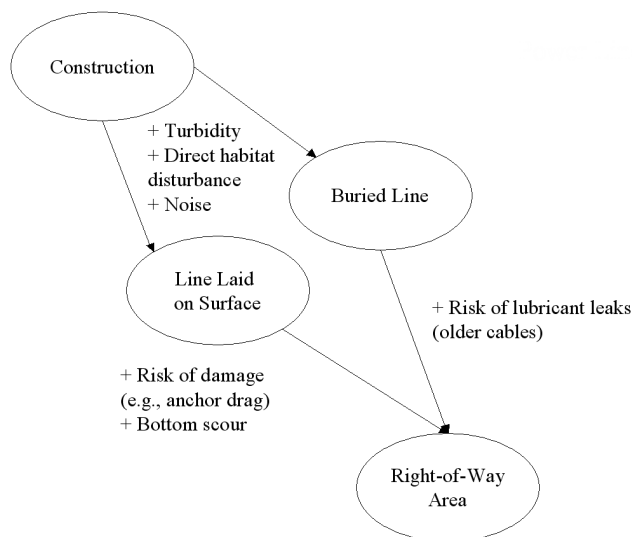


Figure 7: Conceptual diagram of relationship between cable crossing and impacts to the natural environment.

Management Strategies: In general, cable crossings are permissible throughout the reserve area when all general management criteria are met in Section 5.2.1. In addition, project proponents will be required to avoid critical habitat identified at the site by routing cable around or below habitat. Installation must avoid all surface and sub-surface impacts to critical aquatic habitat and species identified in the management plan. Proponents shall be required to survey and video the seabed to show that the planned installation site is free of native vegetation. The installation period must avoid times during migration and spawning in accordance with WDFW hydraulic permit in-water work periods. The DNR prefers that shore-ends use directional drilling or rock-pinning/split-pipe remedial protection if the shore-end is either rocky or an erosion area. When burial is an acceptable installation method, plowing is preferred over using a water-jetting remote operated vehicle. Burial must occur landward of the deepest documented occurrence of native aquatic vegetation.

5.2.2.6 Oil, Gas, Water, and Other Pipelines

Description: Pipelines can carry a number of different types of substances through an enclosed conveyance system. While most easement crossings for pipelines distribute or transmit materials across aquatic lands, some lead to actual discharge points. Pipelines leading to discharges typically carry treated water through marine outfalls. Impacts associated with such discharges are discussed in the outfall sections (Sections 5.2.2.1 and 5.2.2.2).

Environmental Impacts: Pipelines are likely to have both construction related and post-construction environmental impacts (Figure 8). The construction impacts are similar to those for other easement crossings, however larger pipelines typically have larger construction impacts and are more likely to have a profile that may be attractive to encrusting and reef-loving organisms. The operational impacts of a pipeline increase as the size and capacity of a pipeline increase, and is dependent on the type of material being conveyed in the pipeline. Additionally, larger pipelines typically convey larger quantities of materials and therefore may discharge larger quantities of materials if damaged. The type of material being conveyed also dictates the severity of potential impacts from a spill as a result of a damaged pipeline.

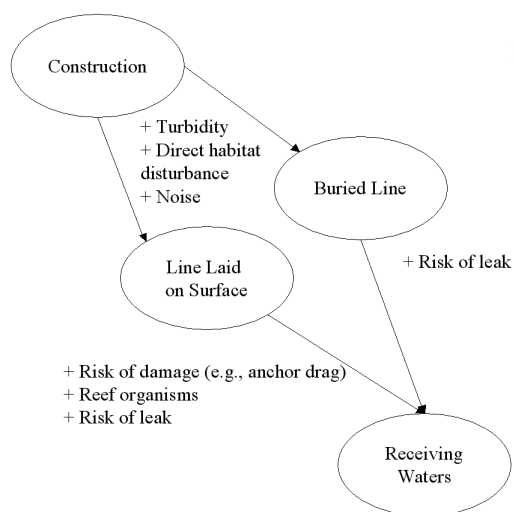


Figure 8: Conceptual diagram of relationship between pipelines and impacts to the natural environment.

Management Strategies: Pipelines are generally permissible in the reserve. In addition to the management strategies for cable crossings, DNR will require that pipelines be directionally drilled below the reserve out to water depths of minus 70 feet at MLLW. Between this depth and ½ mile from the extreme low tide line, pipelines shall be buried leaving no pipeline structures exposed on the seafloor. Additionally, for pipes carrying potentially toxic substances, the project proponent must demonstrate the ability to detect leaks of less than 0.1 percent of total flow (FERC requirements) for the pipeline. Periodic maintenance monitoring will be required for all pipelines to demonstrate that the pipeline is in functioning condition, there is minimal risk of break, and so that it can be repaired or replaced before the end of its functional lifetime.

5.2.2.7 Fish Pens

Description: Floating fish pens are utilized for a variety of purposes: to rear fish, typically salmon, in a confined area to market size, to rear or hold immature fish for

acclimation prior to release, or to hold fish, such as herring, in order to “condition” them for a particular market (e.g., bait).

Environmental Impacts: Fish rearing and holding pens cause shading, concentrate fish waste, and can result in disease outbreaks due to the confinement of a large number of fish in a relatively small area. Some fish pen rearing operations can distribute feed and antibiotics that are not all consumed by the fish and can potentially impact local habitat and aquatic species. There are also threats of negative interactions with native species, predation, and impacts to the local benthic community (Figure 9).

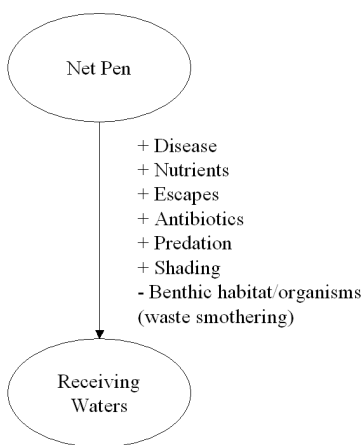


Figure 9: Conceptual diagram of relationship between net pens and impacts to the natural environment.

Management Strategy: Net pens will not be allowed in inner Quartermaster Harbor as this would be in conflict with the reserve. Net pens will be allowed under conditional circumstances in outer Quartermaster Harbor and the Maury Island eastern shore. In these areas, the net pens will be required to avoid habitat identified for conservation, must be sited outside of the intertidal zone in areas with adequate flushing, and may not be located in an area that could cause any impacts to native aquatic vegetation or documented spawning habitat. Herring holding will not be allowed during herring spawning (January through mid-April).

5.2.2.8 Commercial Geoduck Harvest

Description: The Washington Department of Natural Resources, the Washington Department of Fish and Wildlife (WDFW), and the Puget Sound Treaty Indian Tribes (Tribes) jointly manage the wildstock geoduck fishery in Washington State. The State and the Tribes are responsible for estimating geoduck population size, determining sustainable yield, establishing annual harvest rates, and ensuring adverse effects to

the environment from harvest practices are minimized. Treaty fishing rights require a 50/50 split of the geoduck resources between the state and treaty tribes. The DNR has proprietary management interest in the State's half of the harvest and auctions the right to harvest the wildstock geoducks to the private sector. Management of the geoduck resource is dynamic due to changes in market demand, and new information on geoduck biology and population dynamics.

Presently, only the following five commercial geoduck tracts, identified in the 2004 Geoduck Atlas, are within the reserve boundary (Appendix I):

- 10100 – Point Robinson East
- 10150 – Maury Island
- 10250 – Rosehilla
- 10300 – (X) bed (closed to fishing due to pollution)
- 10350 – Neill Point

Environmental Impacts: The largest impact of the commercial geoduck fishery is the removal of a large sessile biomass. Natural recovery is thought to take an average of 30 years (2001 SEIS). Commercial geoduck harvest creates noise associated with commercial boat operations that is above ambient levels. Harvest creates a temporary disturbance to the substrate and water column resulting in impacts to the habitat and species in the area. Additionally, sediment plumes generated from harvest are transported by the currents and settle in other areas within and adjacent to the harvest area resulting in siltation above ambient levels that can potentially impact some resident and migratory fish, adjacent aquatic vegetation, and local benthic communities (Figure 10).

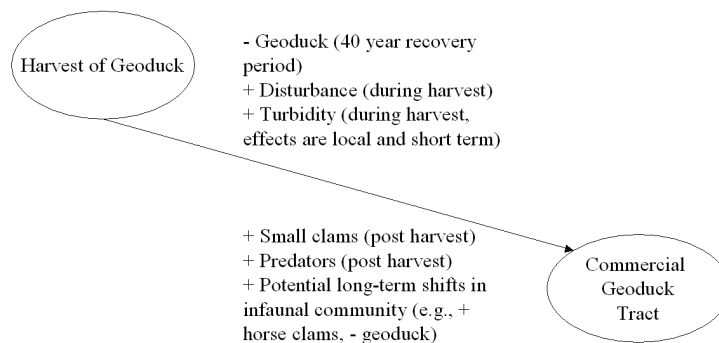


Figure 10: Conceptual diagram of relationship between commercial geoduck harvest and impacts to the natural environment.

Management Strategy: In 2004, only tract 10150 is being fished by the Puyallup Tribe. Harvest agreements between the State and Puyallup Tribe require that harvest must not impact native aquatic vegetation, forage fish spawning or forage fish spawning habitat. There are no immediate plans by the state to fish any tract in the reserve. Present state regulations do not permit the state fishery to be conducted at the Maury Island tract, and only a portion of tract 10100 could be available for the state run fishery because it is beyond 200 yards from the MHHW line. State regulations (RCW 75.24.100) exclude the state geoduck fishery shoreward of 200 yards from MHHW. A State commercial fishery could be conducted on all or parts of tracts 10250 and 10350 that are more than 200 yards from shore. If there is a proposed harvest by the state, DNR must:

- Assess if the commercial harvest can be performed without conflicting with the basis for reserve designation; and
- Manage consistently with the most current version (presently 2000) of the state of Washington Commercial Geoduck Fishery SEIS and associated harvest management plans (Washington State Department of Natural Resources. 2001b).

5.2.2.9 Shellfish Aquaculture

Description: Shellfish Aquaculture is the commercial seeding, growing, and harvesting of marine mollusks and shellfish or other invertebrates in a natural or manufactured environment. Shellfish can be raised on the seafloor, in intertidal or subtidal areas, or can be raised off the bottom. Off-bottom techniques use lengths of line suspended from the surface attached to floating rafts or buoys and anchored to the bottom. Shellfish are then hung on the lines using mesh tubing, bags or trays. Off-bottom techniques are primarily used for mussel aquaculture. Preparation of a site for intertidal cultivation of shellfish can include the removal of competing aquatic species, predators, and aquatic vegetation. Intertidal cultivation of shellfish is conducted through a series of actions that includes cultivation, a period of growth (depending on the species), and harvest.

Environmental Impacts: Some commercial shellfish aquaculture practices result in impacts to aquatic vegetation and substrate in preparation of a new intertidal or subtidal shellfish growing area. Site preparation and ongoing maintenance may have direct and indirect impacts to local fish migration, spawning, and rearing habitat. Aquaculture can change an area of naturally diverse habitat and species into a controlled monoculture (Figure 11).

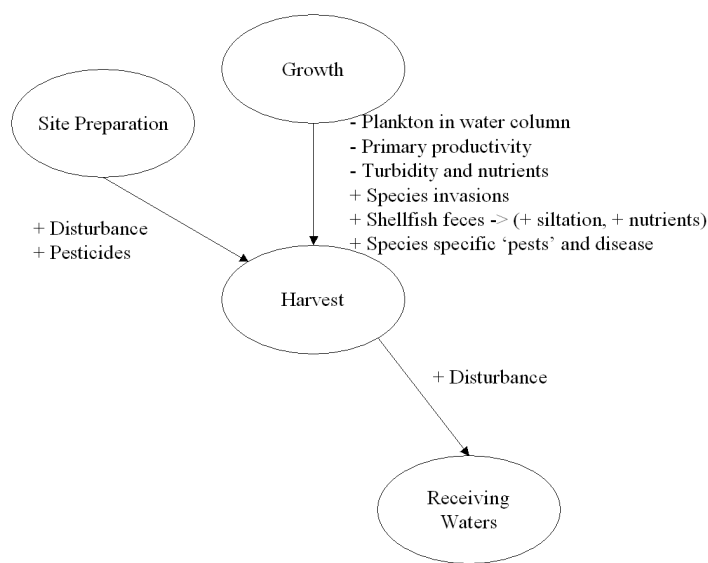


Figure 11: Conceptual diagram of relationship between shellfish aquaculture and impacts to the natural environment.

Management Strategy: Commercial shellfish activities are permissible throughout the reserve, when all general management criteria are met (Section 5.2.1). Use of herbicides and pesticides, cutting, tilling, or otherwise disturbing native vegetation on state-owned aquatic lands will not be permitted. Additional research is needed to fully clarify the potential impacts and benefits of shellfish aquaculture on aquatic habitat and species in the reserve.

5.2.2.10 Marinas and Public Docks

Description: Marinas and public docks provide moorage facilities for commercial or recreational vessels. Typically, marinas are comprised of a series of docks or moorage areas used for transient or permanent vessel moorage. These facilities can include other services such as sewage waste pump-out, fueling facilities, vessel maintenance/repair, upland storage, or upland parking and residential use. Marinas provide important public access for a variety of watercraft and important regional recreational opportunities.

Environmental Impacts: The siting and construction of a marina can cause extensive physical damage to the environment. Pilings and bulkheads all cause major disruptions to aquatic habitat. Poorly designed dock construction can change wave and sediment patterns, leading to the loss of sand and beaches. Marina slips are commonly leased to third parties, which complicate efforts to monitor and prevent impacts. Because of the risk of pollution from marinas, the Department of Health will establish a shellfish closure zone around marinas unless the marina has a pump-out facility and a watch person on-site to ensure that best management practices are

followed. Marinas and public docks cause shading, resulting in changes to the euphotic zone and associated primary production, including impacts to aquatic vegetation. They can also impact water quality and may result in sediment contamination (caused by the use of toxic materials, such as materials treated with creosote), hydrologic alterations, and refuge for predators (Figure 12). Boats that are moored and left in the water year round or seasonally commonly have their hulls painted with a biocide to restrict growth of marine organisms. Boat launching areas can also be entry point for invasive species.

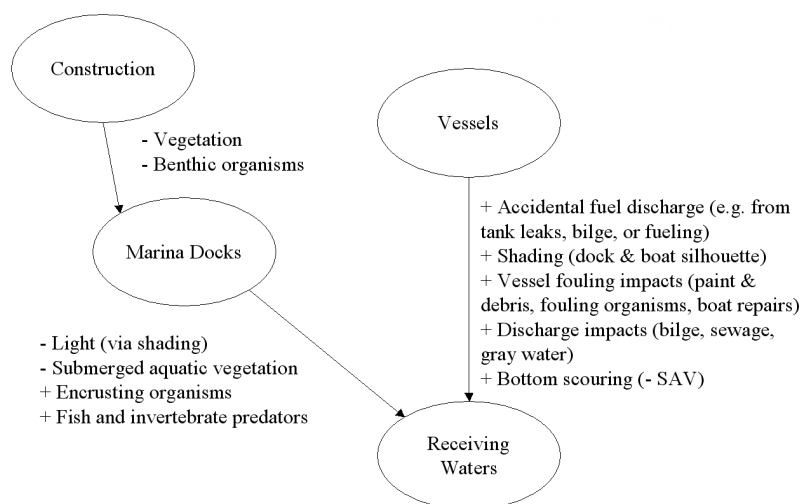


Figure 12: Conceptual diagram of relationship between marinas and public docks and impacts to the natural environment.

Management Strategy: In addition to meeting the general principles and management guidance in Sections 5.2.1 and 5.2.2, new marinas will have to implement specific management strategies described in Sections 5.2.3.1 through 5.2.3.3. The siting of new marinas is contingent on a sitting study to be conducted for the reserve. This study will be done in coordination with local user groups and applicable local, state, and federal government agencies. New marinas are not permissible along the east shore of Maury Island from Piner Point to Point Robinson

The Department of Natural Resources requires all new marinas to have pump-out facilities and to adopt best management practices to assure that no discharges occur, and will work with existing marinas to bring pump-out facilities on-line as soon as possible.

New covered or enclosed moorage will not be allowed within the reserve, as it can cause greater environmental impacts than open moorage. Covered or enclosed

moorage causes greater environmental impacts because it shades the water. It also causes greater aesthetic impacts to surrounding communities.

A marina lease must include provisions for sufficient maneuvering room for entering and exiting the marina. The department does not guarantee that adjacent open-water areas will be available for access to marina facilities, unless the marina owner secures a DNR use authorization for these adjacent areas.

The development of new marinas or expansion of existing marinas will be contingent on a siting study to be conducted for the reserve, in coordination with the local community, existing marina operators, and local, state, tribal and federal governments. This study will assess current and projected future moorage demand in the reserve area.

5.2.2.11 Breakwaters

Description: Typically a large floating or fixed structure placed in the water, breakwaters are used to dissipate and reflect wave energy away from nearshore structures, such as a marina, mooring area, or shoreline structure.

Environmental Impacts: Breakwaters create diversions to the natural hydrology impacting drift cells and the transport of sediment. They can also cause shading of aquatic vegetation and provide additional opportunities for predators of fish that utilize the shallow nearshore zone for migration and feeding (Figure 13). Solid fill breakwaters have greater impacts to the natural environment because they completely displace aquatic habitats.

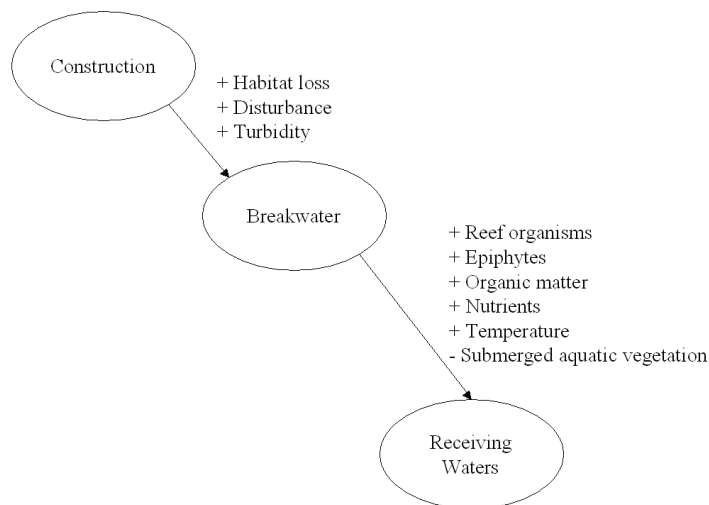


Figure 13: Conceptual diagram of relationship between breakwaters and impacts to the natural environment.

Management Strategy: Breakwaters are allowed within the reserve on a conditional basis as a last resort for uses that can document the immediate need to protect property from imminent threat. Only floating breakwaters will be considered and must be sited to promote circulation and minimize barriers, limit shading, and use environmentally neutral materials.

5.2.2.12 Boat Repair Facilities

Description: Boat maintenance and repair facilities are engaged in any of the following aspects of building and repairing all types of boats: painting, surface preparation, engine maintenance and repairs, and pressure washing.

Environmental Impacts: The variety of practices grouped into this activity can collectively contaminate stormwater and surface water bodies with toxic organic compounds, oils and greases, heavy metals, nutrients, suspended solids, and abnormal pH (Figure 14). Wastes generated by boat repair activities include spent abrasive grits, spent solvent, spent oils, pressure wash wastewater, paint over spray, paint drips, various cleaners and anti-corrosive compounds, paint chips, scrap metal, welding rods, wood, plastic, resins, glass fibers, and miscellaneous trash such as paper and glass. These pollutants may enter the wastewater stream through the application and preparation of paints and the painted surface; the handling, storage and accidental spills of chemicals, leaks or drips of paints, solvents, thinners; the fracturing and breakdown of abrasive grits; and the repair and maintenance of mechanical equipment.

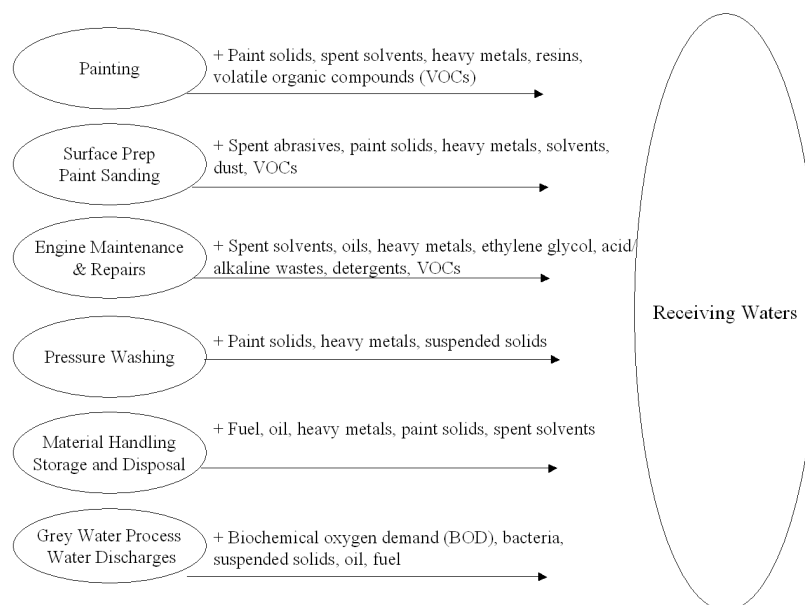


Figure 14: Conceptual diagram of relationship between boat maintenance and repair facilities and impacts to the natural environment.

Management Strategy: Boat repair facilities will not be allowed within the reserve as they would create an overwater use that would be in conflict with the reserve. The following activities are allowed within the reserve: engine repair or maintenance conducted within the engine space without vessel haul-out, topside cleaning, detailing and bright work, electronics servicing and maintenance, marine sanitation device servicing and maintenance that does not require haul-out, vessel rigging, minor repairs or modifications to the vessel's superstructure and hull above the waterline which are not extensive (i.e., 25% or less of the vessel's surface area above the waterline).

5.2.2.13 Industrial Wharves and Piers

Description: Industrial wharves and piers are typically large pier, or moorage facilities and associated support structures (e.g., dolphins). These wharves and piers support upland industrial facilities that need water access to ships or receive materials as part of their industrial operations. There is a great deal of variation in the size of structures, regularity of use, and magnitude of impacts for industrial wharves and piers.

Environmental Impacts: Industrial wharves and piers are typically high impact, heavily used facilities that transport large amounts of material. Environmental impacts tend to be highly correlated with the size of structures, and regularity of use with smaller structures often having proportionately less impacts on the natural environment. Industrial wharves and piers can impact water quality, create diversions in the local hydrology, disrupt sediment flow along drift cells, shade aquatic vegetation, and diminish the euphotic zone in the area of the facility. There is also potential for impacts from noise, prop wash, ballast water and waste discharges, fuel spills, hydraulic fluid spills, material spills, and other activities associated with these facilities that may directly and indirectly impact aquatic flora and fauna (Figure 15).

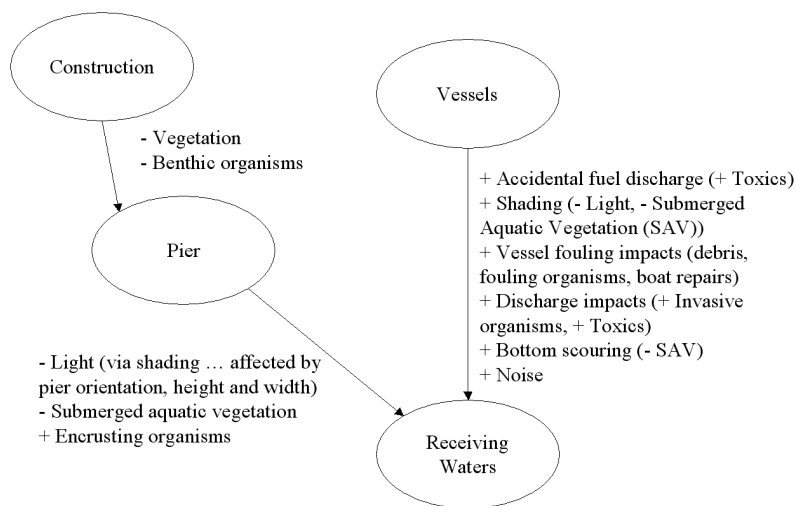


Figure 15: Conceptual diagram of relationship between wharves and piers and impacts to the natural environment.

Management Strategy: New low to no impact industrial wharves and piers may be conditionally allowed in inner and outer Quartermaster Harbor if new structures create no additional impacts to habitat and species identified for conservation at the site.

Locating industrial wharves and piers along the east shore of Maury Island is limited to the area adjacent to the uplands that are zoned by King County for mineral extraction. The construction or maintenance of such facilities must also be consistent with local shoreline designations and other applicable regulations. New structures can create no additional impacts to habitat and species identified for conservation at the site. More specific management actions regarding the existing industrial pier along the eastern shoreline of Maury Island is provided in Section 5.2.3.4.

5.2.2.14 Recreational Mooring Buoys and Docks

Description: Numerous recreational floats, docks and mooring buoys exist within the reserve. These structures are important aspects of island living for local residents because they provide moorage for recreational vessels and local access to the aquatic resources of the area. These structures can serve a vital role in facilitating and promoting appropriate public use and access and in decreasing impacts caused by anchoring within the reserve. Aerial photos show 84 overwater structures within and adjacent to the reserve that shade a minimum of 3.22 acres of habitat (Anchor Environmental 2004). Most of these structures are associated with single-family residences and many are located entirely on private tidelands.

There appears to be two areas within the reserve that currently support a congregation of mooring buoys; one is located in inner Quartermaster Harbor and the other is in outer Quartermaster Harbor adjacent to Dockton Park. There may be other individual mooring buoys located throughout the reserve. As of the publication date of this management plan, few, if any, of the mooring buoys within the reserve were authorized by DNR. The DNR does not know the number of mooring buoys located on state-owned aquatic land within the reserve.

Environmental Impacts: Recreational mooring buoys may cause scouring of aquatic vegetation and other substrate. If properly installed these impacts may be minor or eliminated. In addition, numerous buoys congregated in one area create the potential for shading of aquatic vegetation and discharge impacts associated with the moored vessels (Figure 16).

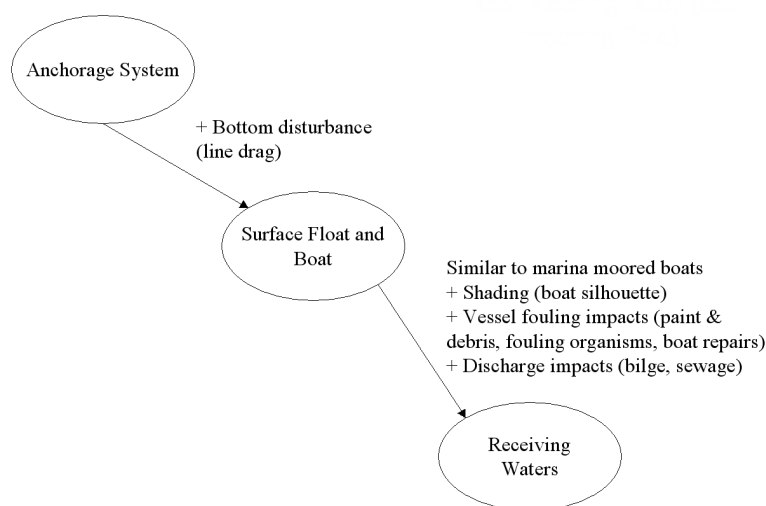


Figure 16: Conceptual diagram of relationship between mooring buoys and impacts to the natural environment.

Recreational docks and floats may cause the same types of negative impacts as those related to marinas and public docks, such as shading, impacts to water quality, sediment contamination, hydrologic alterations, use of toxic materials (such as materials treated with creosote), and provide refuge for predators (Figure 12).

Management Strategy:

Mooring buoys and recreational docks are managed by DNR under RCW 79.90.460 and 79.90.105. Under RCW 79.90.105, residential owners of lands adjacent to state-owned aquatic shorelands, tidelands, or bedlands may install and maintain a mooring buoy and recreational dock without paying a fee to DNR. DNR's current policy is to not require recreational docks to be authorized in writing but to rely on local and state permit requirements for the installation of recreational docks. Mooring buoys located

on state-owned aquatic lands should be authorized by DNR through a no-fee authorization as well as obtain other required local and state permits. Recreational mooring areas will be allowed throughout the reserve based on the following specific management actions:

- Inventory existing buoys and docks on state-owned aquatic lands and identify ownership;
- Cooperate with local authorities and residents to identify appropriate installation methods, locations, and maintenance practices;
- Authorize buoys on state-owned aquatic lands;
- Remove mooring buoys and recreational docks on state-owned aquatic lands that appear to be abandoned as soon as practical, if ownership of inventoried buoys and docks cannot be determined;
- Ensure that all buoys are installed to avoid scouring of aquatic habitat;
- Minimize shading where possible; and
- Promote public awareness of location of eelgrass and forage fish spawning locations.

5.2.2.15 Residential Use (live-aboards)

Description: Residential use includes any person or succession of persons who resides in a specific location or area on state owned aquatic lands for more than 30 days during a 40-day period in a floating vessel or any person who resides in a structure designed to serve primarily as a residence (WAC 332-30-171).

Environmental Impacts: Impacts caused by residential use are similar to those caused by a personal residence and include the discharge of wastewater, house cleaning and maintenance materials, and pet waste, and accumulation and storage of personal property on site. In addition, the potential shading and scouring impacts associated with vessel moorage would also apply to live-aboards.

Management Strategy: Residential use will be limited to ten percent of slips (or local regulations) in accordance with WAC 332-30-171.

5.2.2.16 Log Storage/Booming

Description: Log storage is not as widely used in the aquatic environment as it was historically. Log booming is typically limited to those areas that are adjacent to an area being logged or in areas where raw logs are staged for transport or processing. There are no logging, shipping, or processing facilities within the reserve area.

Environmental Impacts: Log storage and booms cause shading and can impact the euphotic zone, substrate, and aquatic vegetation below the stored logs. In addition, wood and bark fall from the logs and collect on top of the sediment causing an anaerobic benthic environment (Figure 17).

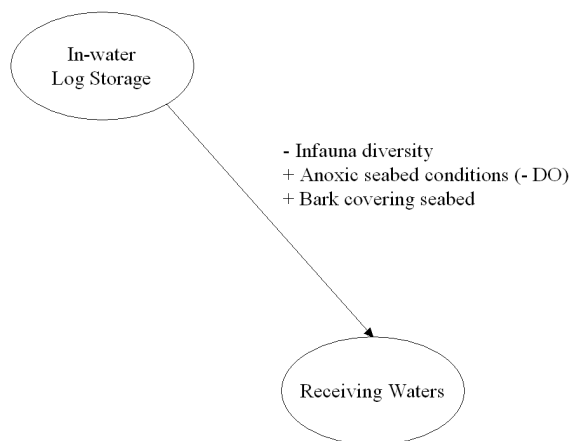


Figure 17: Conceptual diagram of relationship between log storage and impacts to the natural environment.

Management Strategy: Log booming and storage will not be allowed in the aquatic reserve as they would be in conflict with the reserve.

5.2.2.17 Dredging

Description: Dredging may be required to improve navigation and access to facilities that support shoreside industries or recreation and can also be used to mine valuable materials or for commercial shellfish harvest.

Environmental Impacts: Dredging impacts are severe and can permanently alter the substrate, and aquatic vegetation in the area that is dredged. Dredging activities also impact water quality and can disturb migratory and spawning behavior of fish inhabiting the area during the time it is occurring (Figure 18).

Management Strategy: Dredging activities will not be allowed in the reserve unless authorized by the federal government for transportation, flood control, or security purposes as it would be in conflict with the reserve.

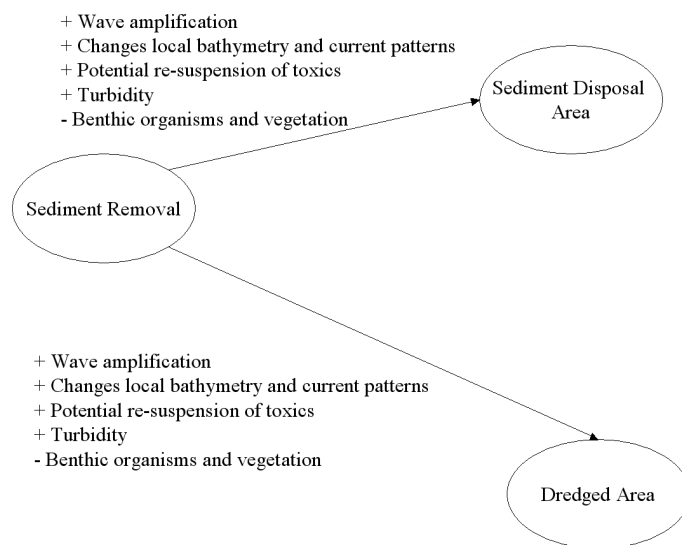


Figure 18: Conceptual diagram of relationship between dredging and impacts to the natural environment.

5.2.2.18 MTCA/CERCLA Sites

Description: State jurisdiction for cleanup of contaminated sites is derived from the Model Toxics Control Act (MTCA), which is administered by the Department of Ecology. The primary federal authority for contaminated sites is the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), which is commonly known as the Superfund program. CERCLA and MTCA are focused primarily on historical contamination problems and involves those sites which are considered to be the highest priorities in terms of potential risks to human health and the environment. The DNR acts as a land manager as well as a trustee under these programs, representing the state's interests (in cooperation with Ecology and WDFW) in clean-up actions and liability responsibilities. There are presently no MTCA or CERCLA sites identified in the aquatic reserve.

Environmental Impacts: Contaminated aquatic sites can produce a number of adverse environmental impacts including alteration of benthic communities, poisoning of aquatic animals that feed in the benthic environment, alteration of aquatic vegetation composition and abundance, degradation of water quality, and other related effects.

Management Strategy: The DNR will allow for impacts from clean up of MTCA or CERCLA sites in the reserve. Clean up must include:

- MTCA/CERLA clean up must be consistent with the management guidance for the reserve described in section 5.2.1.
- Existing and future uses in the reserve must avoid contamination.

- Allowable uses in the reserve will not degrade contaminated sediment clean-up sites.

5.2.2.19 Voluntary Restoration and Enhancement

Description: Voluntary restoration and enhancement activities include projects not required by regulatory agencies. Restoration includes those activities that return an ecosystem to a close approximation of its condition prior to disturbance. Enhancement refers to the modification of specific structural features of an existing habitat to increase one or more functions based on management objectives. Although this term implies gain or improvement, a positive change in one ecological function may negatively affect other ecological functions. Restoration or enhancement projects may be initiated by DNR or other interested parties.

Environmental Impacts: Restoration and enhancement projects will contribute to the improvement and recovery of specific aquatic habitat in the reserve. However, restoration and enhancement activities may cause the physical or functional loss of habitat by temporarily (during the construction of the habitat improvement) or permanently (when “creation” is used as the habitat improvement project) altering existing priority habitat in the reserve.

Management Strategy: Restoration and enhancement activities will be encouraged throughout the reserve based on priorities to be developed through the management plan and the conservation objectives of the reserve. Other actions include:

- Review of existing restoration inventories completed by King County and other entities;
- Completion of a reserve-wide inventory for potential restoration and enhancement projects;
- Evaluation and prioritization of potential projects;
- Securing funding for habitat improvement and restoration projects; and
- Implementation of restoration and enhancement projects.

5.2.2.20 Mitigation

Description: Mitigation is the sequential process of avoiding, minimizing, and compensating for impacts to wetlands and aquatic resources. For activities on state-owned aquatic lands, all practical measures to avoid and minimize impacts must be accomplished before compensatory mitigation is considered. Compensatory mitigation shall only be used to offset impacts that cannot be avoided or minimized.

The DNR will follow Standard Practices Memorandum (SPM) 04-03, Compensatory Mitigation on Aquatic Lands, as interim guidance for authorization of compensatory

mitigation activities on state-owned aquatic lands until new guidance is developed. The goal of SPM 04-03 is to ensure environmental protection by appropriately authorizing compensatory mitigation activities on state-owned aquatic lands. Compensatory mitigation may be required by local, state, and federal regulatory entities under laws such as the federal Endangered Species Act, the federal Clean Water Act, the National and State Environmental Policy Acts, the state Shoreline Management Act, and the state Hydraulic Code (among others).

Agencies require that project proponents identify any potential impacts and mitigate for these impacts in order to reduce the severity of their action. Mitigation sequencing, according to the Washington State Environmental Policy Act (Chapter 197.11 WAC) involves the following steps:

- Avoiding impacts altogether.
- Minimizing impacts by limiting the degree or magnitude of the action.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time.
- Compensating for the impact.
- Monitoring the impact and taking appropriate corrective measures.

Environmental Impacts: Compensatory mitigation projects themselves are intended to offset impacts from other projects, typically some form of development project. As such, compensatory mitigation projects normally result in the improvement of habitat at the compensatory mitigation site. However, compensatory mitigation activities may cause the physical or functional loss of habitat by temporarily (during the construction of the habitat improvement) or permanently (when “creation” is used as the habitat improvement project) altering existing priority habitat in the reserve.

Management Strategy: All impacts within the reserve must be fully mitigated for within the reserve. The mitigation sequence of avoidance, minimization, and compensation will be strictly adhered to and must be consistent with the management guidance described in Section 5.2.1. Compensatory mitigation activities that offset impacts to resources outside the reserve will be allowed if they improve the habitats within the reserve. Compensatory mitigation activities that offset impact to resources inside the reserve must be successfully installed before construction can begin on the associated project. Compensatory mitigation will not be allowed to alter existing priority habitat in the reserve.

5.2.2.21 Mitigation Banking

Description: A mitigation bank is a site where wetlands or aquatic resources, or both, are restored, created, enhanced, or in exceptional circumstances, preserved expressly

for the purpose of providing compensatory mitigation in advance of authorized project impacts to similar resources. The environmental improvements produced at these sites are sold as credits to project proponents needing to fulfill compensatory mitigation.

Environmental Impacts: Mitigation banks are a form of regional compensatory mitigation, with the goal of providing greater resource protection and benefit to the public. Mitigation banking promotes the restoration of an aquatic system to provide off-site compensation for multiple small mitigation projects or single large projects, resulting in economies of scale in planning, implementation, and management. Consolidation can result in aquatic systems of greater value because of their size and the commitment to long-term management. Mitigation banking can also result in aquatic systems of greater ecological value by reducing the effects of habitat fragmentation and through the restoration of historic aquatic habitat diversity and distribution within an ecoregion.

Management Strategy: Mitigation banking shall be encouraged throughout the reserve based on priorities identified in the management plan or other documented publications.

5.2.2.22 Non-Water Dependent Uses

Description: WAC 332-30-106(43) defines non-water dependent use as:

Non-water dependent activities are uses that can exist and operate in a location other than the waterfront. Examples include, but are not limited to, hotels, condominiums, apartments, restaurants, retail stores, and warehouses not part of a marine terminal or transfer facility (RCW 79.90.465).

Environmental Impacts: Non-water dependent uses create modifications to the shoreline and aquatic environment.

Management Strategy: Non-water dependent uses are not preferred uses, and will be evaluated based on the management of activities discussed in this management plan.

5.2.2.23 Shoreline Modifications on State-Owned Aquatic Lands

Description: Shoreline modifications include bulkheads and armoring of state-owned shorelines.

Environmental Impacts: Shoreline modifications interfere with natural shoreline erosion by interrupting and exacerbating shoreline erosion processes, disrupting surface and groundwater hydrology, interfering with fish migration and spawning habitat, and resulting in the removal of shoreline vegetation.

Management Strategy: There is very little state-owned shoreline within the reserve boundary. New shoreline modifications that create environmental impacts (described above) will not be allowed on state-owned aquatic lands throughout the reserve. The DNR will inventory state lands for existing modifications. Plans will be developed to remove or replace, if appropriate, shoreline modifications to minimize impacts.

5.2.2.24 Public Use

Description: Providing public use to state-owned aquatic lands is one of DNR's primary mandates. To accomplish this mandate, DNR typically authorizes structures and facilities (such as boat ramps, marinas, and public boardwalks) through the issuance of leases or easements. There are currently four public access sites near or within the reserve. These include King County's Marine Park, Burton Acres, Point Robinson Park, and Dockton Park. Dockton Park is the only public access site that is within the aquatic reserve on state-owned aquatic land. The other three public access sites are on lands that are not owned by the state and do not require further management action (i.e., authorization) on behalf of DNR. In addition, public uses within the reserve such as shellfish harvest, boating, fishing, crabbing, beach walking, leisure time, the 4th of July fireworks display, and other uses are discussed in section 5.3.4.

Environmental Impacts: Public facilities like docks and marinas produce the same possible impacts as described in section 5.2.2.10. Public use can result in the removal of aquatic life and potential impacts associated with overuse or misuse.

Management Strategy: DNR would promote and encourage appropriate, legal public use within the reserve conducted in a manner that preserves the habitats and species of the reserve. In addition, DNR, through cooperation with local residents and interest groups, assess whether additional public access is needed and where within the reserve it should be sited.

5.2.2.25 Unauthorized Structures

Description: There may be in-water and over-water structures within the boundaries of the reserve that have not been authorized by DNR, such as fish pens, non-recreational docks and piers, and dolphins.

Environmental Impacts: Expected impacts are the same as those identified for the specific types of structures (i.e., docks, fish pens, etc.) that are in trespass.

Management Strategy: DNR will develop an inventory of structures, determine the types of uses, and determine possible impacts to habitats and species identified in this plan. Those activities determined to pose no or minimal environmental concerns relative to the intent of the reserve, as described in this management plan, and that can be authorized will be identified and documented by DNR staff and allowed to

remain until owners can be contacted. The DNR will then work cooperatively with the owners of the structures to secure an authorization, as appropriate, and eliminate or reduce any associated impacts to the habitats and species identified for conservation in the reserve. When a structure is not authorized and is deemed an inappropriate use of state-owned aquatic lands (such as a nonwater-dependant floating commercial operation) or derelict/abandoned (such as excess and orphaned pilings and dolphins), the structure will be treated as a trespass. The DNR will take appropriate legal actions as needed to rectify the trespass.

5.2.3 Specific Management Strategies for Existing and Pending Uses

Use authorizations for activities that were granted prior to the establishment of the reserve (Appendix J) will be honored throughout the duration of their current authorized periods. In addition, pending uses of state-owned aquatic lands that were proposed prior to reserve establishment will be evaluated in the same manner as existing uses.

DNR recognizes that existing uses were constructed and initiated prior to reserve designation and that there may be current and continuing environmental impacts to the species and habitats targeted for conservation within the reserve associated with these uses. Under the management plan, existing authorized uses and those currently negotiating authorizations within the reserve would be subject to the same general programmatic requirements and the management strategies described in section 5.2.2 and Appendix O. Existing uses may be re-authorized, expanded, or upgrading if planned operations make use of available and reasonable technologies and result in fewer impacts to the natural environment than under existing conditions. The DNR staff will work cooperatively with lessees to develop site plans that will identify measures to reduce ongoing site-specific environmental impacts related to existing facilities and implement these over the course of the 90-year term of the reserve.

In addition to the general management principles for activity types presented in Section 5.2.1 the specific management provisions below will apply to existing authorized and proposed uses.

All use authorizations that were in good standing and existed within the reserve at the time of reserve designation, whether in normal or holdover status:

- May conduct maintenance and construction activities as per the existing terms and conditions of the original agreement;
- May be re-assigned to another entity under the existing terms and conditions of the original agreement; and
- May be processed for re-authorization upon expiration, including an evaluation based on the adopted site management plan to assess their compatibility with the reserve and reserve goals. Activities determined to be compatible may be re-authorized. Activities determined not to be compatible will be addressed to determine if and how, over time, the activities could be modified to make them

compatible. If, after all appropriate strategies have been attempted, the activities remain incompatible with the reserve; the activity will not be re-authorized.

There are currently eight existing and proposed activities on state-owned aquatic lands within or near the reserve (Appendix J). These include:

- Quartermaster Yacht Club – Lease 20-011434;
- Quartermaster Harbor Marina – Lease 20-010075;
- Dockton Marina – Lease 20-009814;
- Glacier Northwest’s Gravel Barge Loading Facility – Lease 20-012778 (application pending);
- Puget Sound Energy Utility Rights-of-Way (three separate crossings) – Leases 51021507, 51027510, and 51033836; and
- Comcast Utility Right-of-Way Lease 51-075015.

5.2.3.1 Quartermaster Yacht Club

The Quartermaster Yacht Club is a non-profit organization that provides private boat mooring. The yacht club has 94 slips, although only approximately 92 of the slips are located within the 2.97-acre area of the DNR lease. In addition, there is approximately 200-feet of dock that provides transient moorage to members of other yacht clubs with which Quartermaster Yacht Club has reciprocal agreements. The yacht club is currently filled to capacity and has a waiting list for individuals that wish to join. There is a pump house on site for use by the club’s members and their guests. Effluent from the pump house is directed to a storage tank, which is emptied and disposed of by a contracted operator. The current lease of the yacht club expired on January 9, 2001, and has been in holdover status since that date, pending the decision on how the Maury Island site should be managed. Since 2001, the yacht club has operated on a year-to-year agreement with DNR based upon the conditions of the original lease. The owners are considering expansion of the marina to accommodate increasing demand.

The Quartermaster Yacht Club will be treated as an existing use within the reserve. As such, DNR will work cooperatively with the lessee to develop a site plan that over time will be implemented to meet the criteria established in the reserve management plan Section 5.0. The activity will be allowed to continue within the reserve if it successfully meets these criteria. The fundamental moorage service of the yacht club serves the primary objective of the reserve by actively reducing impacts to the habitats and species caused by anchoring within the harbor. The DNR will, however, work collaboratively with the lessee to determine additional ways it can serve the objectives of the reserve and consider the management actions described below to reduce the impacts to the habitats and species within the reserve. Future

improvements to Yacht Club facilities to reduce these impacts will be implemented as the remaining economic life of the existing structures is realized or as there are expansions or upgrades to the facility.

Quartermaster Yacht Club-Specific Management Provisions

Marina design and maintenance

- Use pier design that enhances water circulation.
 - Design marina expansions or upgrades with as few segments as possible to promote water circulation.
 - Use open design of for marina expansions or upgrades to minimize barriers that may restrict the exchange of ambient water and water within the marina area.
- Use environmentally neutral materials.
 - Use materials that will not leach hazardous chemicals into the water and that will not degrade in less than ten years time. New pilings or other structures in or above the water could be made of reinforced concrete, coated steel, recycled plastic, plastic reinforced with fiberglass, or other non-leaching materials.
 - Do not use wood treated with creosote, chromated copper arsenate (CCA), ammoniacal copper zinc arsenate (ACZA), or ammoniacal copper arsenate (ACA).
 - Use floatable encapsulated foams to prevent the break-up and release of styrofoam to the aquatic environment.
- Limit shading areas over water.
- Eliminate construction and repair noise during spawning and migration periods, as specified in the Hydraulic Project Approval to be secured from WDFW.
- Employ “soft” shore erosion control measures.
- Comply with local regulations.
- Meet other federal and state permitting requirements.
- Avoid intermittent lighting during construction and operation on or near water during known forage fish spawning periods.

Vessel Maintenance and Repair

- Perform all major repairs in a designated upland area that will not impact aquatic areas.
- Comply with all local regulatory requirements.
- Obtain a valid National Pollutant Discharge Elimination System (NPDES) permit for maintenance and repair yards that discharge to surface waters.

- When washing boats in the water, use soaps sparingly. When washing with soap is necessary, use soaps that are phosphate-free, biodegradable, and non-toxic. Avoid cleansers that contain ammonia, sodium hypochlorite, chlorinated solvents (bleach), petroleum distillates, and lye.
- Recycle used oil, oil filters, and antifreeze at a hazardous waste collection facility.

Waste Containment and Disposal

- Comply with the Federal Clean Water Act that requires any vessel with an installed toilet be equipped with a certified Type I, Type II, or Type III marine sanitation device (MSD).
- Discourage discharge of wastewater at the slips.
- Provide shoreside restrooms.
- The DNR recognizes the need for a better functioning and more publicly accessible boat waste pump-out facility in the Burton area of inner Quartermaster Harbor. The DNR will work with the Quartermaster Yacht Club and the Quartermaster Marina to establish an operable pump-out facility that is accessible to their respective members, patrons, and the general public.

Residential Use

- Provide a pumpout system, require regular mobile pumpout service, or install direct sewer hookups for existing residential use.
- Maintain slips closest to shoreside restrooms for residential users.
- Stipulate in the lease agreement that vessels used as residences may not discharge any sewage to the reserve
- Meet the requirements of the DNR Residential Use rules.
- Comply with local and state regulations.

Suggested Upland Management Practices

- Minimize impervious surfaces.
- Use upland and inland areas to:
 - Locate buildings, workshops, and waste storage facilities,
 - Locate parking and vessel storage areas,
 - Locate boat repair facilities.
- Expand landward - When possible, expand storage capacity by adding dry-stack storage rather than adding wet slips.
- Use upland detention and treatment where possible to control stormwater runoff.
- Meet all local and state requirements for stormwater management.

Monitoring

Monitor impacts of the construction, maintenance, and operation of the facility that are identified in the HPA, local shoreline permit, other permits, and in the DNR lease agreement. Efforts will be made to develop one monitoring plan that will meet all agency requirements.

5.2.3.2 Quartermaster Harbor Marina

The Quartermaster Harbor Marina, owned and operated by Polaris Development, LLC, is under a DNR lease for the use of 3.09 acres of state-owned aquatic lands. The marina consists of a 65-slip structure that supplies private vessel moorage. The marina provides a portable pump unit for use by clients. The pump unit is emptied into the marina's drain field. A permanent pump house is not provided at the site to ensure that fuel or hydraulic fluids do not contaminate the drain field. Except for two vessels, boats moored at the site are not to be used as residences. Sediment surveys conducted in 1992 found that the sediments in the area are relatively clean. The current lease expires on November 14, 2004. An expansion is being considered by the marina owner to accommodate increasing demand.

Quartermaster Harbor Marina-Specific Management Provisions

The Quartermaster Harbor Marina will be treated as an existing use within the reserve. As such, DNR will work cooperatively with the lessee to develop a site plan that over time, will be implemented to meet the criteria established in the reserve management plan (Section 5.2). The activity will be allowed to continue within the reserve if it can successfully meet these criteria. The fundamental moorage service of the marina serves the primary objective of the reserve by actively reducing impacts to the habitats and species caused by anchoring within the harbor. The DNR will, however, work collaboratively with the lessee to determine additional ways it can serve the objectives of the reserve. Future improvements to marina facilities to reduce these impacts will be implemented as the remaining economic life of the existing structures is realized or as there are expansions or upgrades to the facility.

Quartermaster Marina-Specific Management Provisions

Management strategies will be the same as those identified for the Quartmaster Yacht Club in Section 5.2.3.1.

5.2.3.3 Dockton County Marina

King County and DNR have entered into an interagency agreement for the use of 0.81 acres of state-owned aquatic lands for the purposes of a public pier and boat dock. The boat dock provides 58 slips for transient small boat moorage and a utility building that includes restroom and laundry facilities. All sewage from the utility building is pumped to an upland facility. The pier is a wood and concrete structure primarily suspended by wooden piles, with a wooden deck on Styrofoam floats for the mooring slips. There is a concrete seawall along the shoreline of the majority of

the park. The park also includes a public boat ramp to the west of the pier. Sediment sampling conducted in 1992 found that the area is relatively clean of hazardous substances. The current inter-agency agreement expires in 2012.

Dockton County Marina-Specific Management Provisions

The Dockton County Marina will be treated as an existing use within the reserve. As such, DNR will work cooperatively with the lessee to develop a site plan that over time, will be implemented to meet the criteria established in the reserve management plan (Section 5.2). The activity will be allowed to continue within the reserve if it can successfully meet these criteria. The fundamental moorage service of the marina serves the primary objective of the reserve by actively reducing impacts to the habitats and species caused by anchoring within the harbor. The DNR will, however, work collaboratively with the lessee to determine additional ways it can serve the objectives of the reserve and consider the management strategies identified for the Quartermaster Yacht Club in Section 5.2.3.1 to reduce the impacts to the habitats and species within the reserve.

Future improvements to Dockton County Marina facilities to reduce environmental impacts will be implemented as the remaining economic life of the existing structures is realized or as there is expansion or upgrades to the facility.

The DNR recognizes the need for a better functioning and more publicly accessible boat waste pump-out facility in the Dockton Area. The DNR will work with King County Parks to maintain an operable pump-out facility that is accessible to the general public.

5.2.3.4 Glacier Northwest's Maury Island Gravel Barge Loading Facility

Glacier Northwest's Maury Island gravel mine is located along the southeastern shoreline of the island between the communities of Gold Beach and Sandy Shores. Mining has occurred on the site since the early 1940s. The actual mine site is located upland and comprised of approximately 235 acres of which only about 40 acres have been disturbed by previous mining activities. Mining is currently permitted on the site under King County Grading permit No. 1128-714 and DNR Surface Mining Reclamation Permit No. 1128-714. These permits allow mining on approximately 193 acres of the site. The site contains a portable screening plant, dock, and conveyor system. Current mining activities consist of occasional sand and gravel extraction for local use. Approximately 10,000 tons per year have been extracted from the site under the existing grading permits. However, removal of gravel from the site has not occurred via the existing dock and conveyor system located on state-owned aquatic lands within the reserve for over 20 years.

A use authorization application was submitted to DNR in 2000 to replace the existing dock and conveyor system in order to undertake more intensive gravel extraction

activities at the site; the application was denied at that time. Glacier NW resubmitted an application to DNR in 2001. The 2001 application will not be considered by DNR until this management plan is finalized and the project proponent has obtained all required local, state and federal permits. Glacier's current proposal is to rebuild the existing loading dock, which would moor up to four 10,000-ton barges (330 feet long by 80 feet wide) or a greater number of smaller barges per day during the 11 to 50-year period that mining could be conducted at the site (King County 2000). All local, state and federal permits must be secured prior to consideration by DNR of this activity in the aquatic reserve. King County (2004) recently denied Glacier Northwest their shoreline substantial development permit for this revised project. This decision was appealed to the Shorelines Hearings Board. At the time this plan was printed, the future of the new barge loading facility was uncertain.

Glacier Northwest-Specific Management Provisions

The Glacier Northwest gravel barge loading facility will be treated as an existing use within the reserve. As such, DNR will work cooperatively with the proponent to develop a site plan that over time meets the criteria established in the reserve management plan (Section 5.2). In addition, barge loading will be considered within the reserve if the facility secures all necessary local, state and federal regulatory permits, and can successfully meet the criteria below:

Facility Design and Maintenance

- Removal of existing pilings and over-water structures treated with creosote and other toxic materials. New construction should include environmentally neutral materials for pilings and structures in or above the water. Examples include construction materials made of reinforced concrete, coated steel, recycled plastic, or plastic reinforced with fiberglass.
- All stormwater from upland facilities must be infiltrated on upland locations to eliminate any direct discharges to marine waters. Stormwater facilities should be designed to mimic the natural hydrology of subsurface water and natural surface water flows to receiving waters.
- Vessel and facility maintenance and repair materials, such as paints, solvents, and cleaners, should be stored and used in a manner and location that will not impact aquatic areas.
- All upland mining and loading operations should implement BMPs to eliminate impacts of turbidity on native aquatic vegetation, spawning substrate, and resident and migratory fish populations that utilize the surrounding aquatic areas.
- Existing and new facilities should not increase shading of the euphotic zone over existing levels.
- Shoreline hardening and vegetation removal should be avoided.

- Facilities should be constructed to minimize hydrologic alterations and disruption of nearshore drift cells and longshore currents.
- Construction, maintenance, and operational noise should be eliminated during known forage fish spawning periods (January through mid-April) if facility is located in or near spawning areas.
- Noise impacts from operation and barge traffic should be minimized to eliminate impacts during critical fish and wildlife migratory periods.
- Intermittent lighting during construction and operation on or near the water during known forage fish spawning periods must be eliminated.
- Lighting during operations that will impact fish migration or behavior patterns must be eliminated.
- “Propeller wash” especially from large vessels should not result in scouring of the tideland and bedland areas, which disturbs plant and animal life.
- Practices to minimize spillage of any materials during loading and off-loading must be established in addition to practices that will contain and recover any potential spillage that could occur during operations.
- While the fundamental objective of issuing the Glacier Northwest lease would be to support water dependent uses, (i.e., shipping gravel from their gravel mining operations), DNR will work collaboratively with the lessee to determine ways in which their use authorization can serve the objectives of the reserve.

Prior to considering a lease for this operation, DNR will continue to review local, state, and federal permits to evaluate if the resources (identified in Section 4.0 and Appendix C) are provided adequate long-term protection to achieve the desired future conditions described in Section 4.5. Supplemental lease provisions (in addition to the provisions specified by regulatory entities) may be required to ensure long-term conservation of habitat features and species within the reserve.

Monitoring

The proponent must monitor impacts of construction, maintenance, and operation of the facility, as identified in the HPA, local shoreline permit, other permits, and in the DNR lease agreement. Efforts will be made to develop one monitoring plan that will meet all agencies requirements.

If the gravel barge loading facility is eventually not built, the DNR will work with the owners to develop a schedule to remove the existing pier.

5.2.3.5 Puget Sound Energy Utility Rights-of-Way

Puget Sound Energy has three rights-of-way agreements for submarine cables. These cables cross the Maury Island site at the Luana Beach area on the northeast shore of

Maury Island. The cables are used for telecommunications, power, and natural gas, which are important services to the residents of Vashon and Maury islands. The authorization of the use of these state-owned aquatic lands is valid in perpetuity. The existing utilities are static in the environment and pose no noticeable impacts to existing habitats.

Puget Sound Energy-Specific Management Provisions

The Puget Sound Energy utility rights-of-way will be treated as existing uses within the reserve. Since these cables are buried and do not require active management or access, they do not impact the habitats and species identified for protection in this plan. It is not anticipated that Puget Sound Energy will need a site plan to meet the criteria established in the reserve management plan. Repairs and maintenance activities will be required to consider impacts to the habitats and species identified for conservation. Emergency repairs will be managed through the appropriate local, state, and federal regulatory agencies. Since the easements are perpetual, there will not be an opportunity to “re-open” or re-authorize the conditions of the rights-of-way. Puget Sound Energy will not be required to undertake activities that primarily support the objectives of the reserve. However, DNR will seek opportunities for voluntary and collaborative changes, as they are identified, to support the reserve.

5.2.3.6 Comcast Utility Right-of-Way

The project proponent, Comcast, is proposing to lay a submarine fiber optic cable from the mainland to Maury Island, landing at Luana Beach, to provide enhanced video and high-speed internet services. A right of way will have to be obtained from DNR for this use. At the time of this writing, Comcast has had preliminary communications with DNR about acquiring a right of way.

Comcast-Specific Management Provisions

The DNR will review the project proposal as per Section 5.2.2.5 to ensure that it will not impact any of the habitats and species identified in this plan for conservation. Other aspects of the lease will be managed under normal leasing criteria.

5.3 DNR Led and Partnering Activities

The following section describes a number of activities to be implemented within the reserve that may not require a use authorization but could be implemented by DNR alone or in partnership with other entities. These activities (i.e., derelict vessel removal, aquatic nuisance species management) would be conducted in an effort to better meet the goals and objectives for the reserve.

5.3.1 Derelict Vessels

Description: A vessel is considered derelict if the vessel’s owner is known and can be located, and exerts control of a vessel that:

- Has been moored, anchored, or otherwise left in the waters of the state or on public property contrary to RCW 79.01.760 or rules adopted by an authorized public entity;
- Has been left on private property without authorization of the owner; or
- Has been left for a period of seven consecutive days; or
- Is sunk or in danger of sinking, is obstructing a waterway, or is endangering life or property.

Derelict vessels can be a hazard to navigation, public safety, and the environment. The DNR has the authority under RCW 79.100 to manage the Derelict Vessel Removal Program. At the time this plan was published, it was unknown how many, if any, derelict vessels existed within the reserve. At least one derelict or abandoned vessel is located at the mouth of Judd Creek, but it is uncertain whether this structure is on state-owned aquatic land.

Environmental Impacts: The scope of impacts to the natural environment resulting from derelict vessels is dependent on the size, location, and contents of a derelict vessel. Vessels in immediate danger of sinking are most likely to release toxic substances or become a potential navigational hazard. Most vessels carry some quantity of petroleum products that if released, would harm fish and wildlife and potentially contaminate human food and water supplies. Sunken vessels also smother aquatic habitat and may cause scour if vessels shift around due to currents or tidal changes.

Management Strategies:

The DNR will inventory existing derelict or abandoned vessels throughout the reserve, regularly identify the arrival of new derelict or abandoned vessels, and remove vessels per DNR Derelict Vessel Program guidelines.

5.3.2 Land Acquisition for Habitat

Description: The DNR may acquire aquatic habitat through exchanges that are consistent with RCW 79.90.455, or through special land transaction (through the DNR Natural Resource Conservation Area and Natural Areas Programs). Presently, DNR has no specific authority and has no dedicated funding to purchase aquatic lands.

Environmental Impacts: The acquisition of critical habitat adjacent to the aquatic reserve will enhance opportunities for conservation of the habitats and species identified in this plan.

Management Strategy: Habitat acquisition priorities throughout the reserve will be developed through the management plan and include the following actions:

- Work with King County, the Vashon-Maury Island Land Trust, local citizens, and other interested parties to establish priorities for habitat acquisition;

- Identify opportunities to acquire prioritized habitat that will complement the existing habitats and species within the reserve;
- Secure funding for habitat acquisition;
- Where acquisition of important aquatic habitat is not an option, work cooperatively with owners of adjacent lands (on a voluntary basis) to identify and address specific habitat restoration and conservation opportunities on their properties; and
- If after the reserve is established, intertidal areas directly adjacent to and shoreward of the reserve area come into state ownership, DNR can choose to include these areas into the aquatic reserve. The new area would be managed according to this management plan.

5.3.3 Aquatic Nuisance Species Management

Description: Aquatic nuisance species can include both plants and animals. Readily observed examples of aquatic invasive species in the inland marine waters of Puget Sound and the Georgia Basin include cordgrasses (*Spartina spp.*), Japanese eelgrass (*Zostera japonica*), oyster drill (*Cerastostoma inornatum*), varnish or dark mahogany clam (*Nuttalia obscurata*), and the European green crab (*Carcinus maenas*). Species of concern for marine waters, identified by WDFW, include *Spartina*, European green crab, Chinese Mitten Crab (*Eriocheir sinensis*), and purple varnish clam (*Nuttalia obscurata*). *Spartina* was first discovered on Vashon Island in 1993 at Fern Cove on the northwest side of Vashon Island. Since then, *Spartina* has been found near the Maury Island site in Raab's Lagoon, Point Heyer, and Tramp Harbor. Several other invasive species have been detected within or near the aquatic reserve. No systematic survey has attempted to assess which species are present. Table 3 of Appendix C describes non-native and cryptogenic species that have been detected in Puget Sound and several species on this list are likely to occur within the reserve.

Environmental Impacts: Plant and animal aquatic invasive species pose a serious threat to compete, displace, disturb and consume native species. With improvements in travel technology, the rate of introductions of nonnative species has increased dramatically.

Management Strategy: Aquatic nuisance species that are identified in the reserve will be managed in cooperation with the Washington Department of Agriculture, WDFW, and the King County Noxious Weed Board. Priorities for aquatic nuisance management will be developed through implementation of the management plan.

5.3.4 Public Recreational Use

Description: While DNR promotes public use through proprietary authorizations, DNR does not have regulatory authority to manage public recreational activities such as boating, fishing, shellfishing, swimming, and beach walking. Beach walking likely occurs extensively along the reserve boundary on privately owned and state-owned aquatic tidelands. Recreational clam harvests are known to occur at Burton Acres and Point

Robinson parks and likely occur at the other public beaches within the reserve. Boating and fishing are other common activities that occur within the reserve. Reports from local citizens indicate that water-skiing is another favored activity within Quartermaster Harbor due to the relatively calm waters in the area.

Environmental Impacts: Transient recreational activities, if not conducted responsibly, could produce adverse impacts on the aquatic habitats and species within the reserve.

Management Strategy: The DNR will promote and encourage appropriate, legal transient public recreational activities within the reserve (such as boating, water-skiing, fishing, shellfishing, swimming, and beach walking) conducted in a manner that preserves the habitats and species of the reserve.

To accomplish this, DNR will:

- Inventory the types, magnitude, and location of transient public recreational activities;
- Determine if inventoried activities are causing impacts to the habitats and species targeted for conservation within this plan; and
- If it is determined that impacts are occurring, DNR will work cooperatively with user groups and appropriate regulatory agencies to identify opportunities for voluntary efforts that avoid and minimize the impacts.

5.3.5 Outreach and Education

Description: The DNR's outreach and education efforts will focus on identifying the site as an aquatic reserve and working collaboratively with the King County Maury Island Aquatic Steward, the entities identified in Appendix B, and local residents to promote and protect the reserve.

Environmental Impacts: Outreach and education can produce beneficial environmental impacts by bolstering understanding of the importance of aquatic habitats, species, and ecological processes. Such efforts can lead to individuals, businesses, and government entities working together to improve the environmental features of the reserve.

Management Strategy: DNR will work with user groups, local environmental groups, local clubs, region staff, and other interested citizens to implement a number of education and outreach actions including:

- Placement of signs and boundary markers in and adjacent to the reserve;
- Dissemination of information on BMPs related to bulkheads, riparian management, septic tanks/fields, docks, and mooring buoys to local residents;
- Dissemination of information on BMPs for commercial activities (e.g., docks and marinas) to businesses;

- General education activities such as school visits, shoreline stewardship walks, and interpretive signage;
- Identification of opportunities (such as locating funding sources) to interface voluntary management of private aquatic lands with the aquatic reserve management; and
- Development of a process for working with local jurisdictions, regulatory agencies, and adjoining landowners to identify and minimize off-site impacts.

5.4 Private and Public Land Adjacent to the Aquatic Reserve

Approximately 88 percent of the tidelands in Quartermaster Harbor and the east shore of Maury Island are not owned by the state. Private property ownership makes up most of the aquatic lands and uplands adjacent to the aquatic reserve. The Vashon Park District owns and manages the Point Robinson Light House, which is on the National Historic Register, and the Burton Acres Park Northeast. King County owns and manages the Maury Island Marine Park, Dockton Park, and an undeveloped site (of about 50 acres, including about 600 feet of shoreline) along the lower western shore of Quartermaster Harbor. King County also has regulatory jurisdiction over land-use in and adjacent to the aquatic reserve through the County's Shoreline Master Program (Appendix K), Comprehensive Land Use Plan (Appendix L), and King County Code.

The DNR does not have proprietary authority over aquatic lands and uplands that are not owned by the State of Washington. However, DNR has identified activities, such as shoreline modifications, non-point source pollution, and private docks and floats, that occur on aquatic lands and uplands adjacent to the reserve that may impact habitats and species identified for conservation in the reserve (Broadhurst 1998).

Therefore, the successful conservation of critical habitats and species that occur adjacent to the aquatic reserve will be enhanced by implementation of existing local and state government regulations, as well as voluntary stewardship activities undertaken by shoreline property owners. The success of the reserve will be improved with the cooperation and willingness of the local government and local citizens to address and manage potential impacts outside of the reserve boundaries on adjacent privately and publicly owned aquatic lands and uplands.

5.4.1 Shoreline Modification

Approximately 60 percent of the shoreline surrounding the reserve has been modified in some manner (Appendix M). Shoreline modification can lead to cumulative impacts to the reserve by interfering with natural erosion processes, scouring the beach, and the removal of shoreline vegetation. These impacts can lead to long-term effects on the physical

structure and biological composition of the beaches. The DNR will rely on King County⁵ and WDFW⁶ to properly manage and permit activities on lands adjacent to the reserve to conserve these habitats and ecological processes.

While DNR recognizes that there may be instances where threats to private property may need to be addressed through engineered solutions, in many instances soft techniques that mimic natural processes are as effective as traditional hard solutions (King County 2002; Menashe 2001; Williams and Thom 2001). The DNR will support King County's existing regulations for soft armoring solutions, as well as provide guidance for local property owners. The County's guidance will be considered when seeking preferred option for the repair and replacement of existing hard armor and to resolve current and future threats to private property.

Management Strategy:

The DNR will:

- Work in cooperation with adjacent landowners (on a voluntary basis) in efforts to gain support for the reserve and to help reduce impacts caused by shoreline modification; and
- Seek funding opportunities and create incentives for the adoption of best management practices (BMPs) and improvement of shoreline conditions, through "soft" armoring techniques such as beach nourishment, riparian plantings, and other alternative strategies to reduce shoreline impacts.

5.4.2 Non-Point Source Pollution

Non-point sources of pollution are difficult to address because they are diverse in nature and are caused by a variety of sources spread over a relatively large geographic area. Non-point sources of pollution around the reserve are a relevant issue for DNR because they can degrade water quality within the site and contribute to reduction in light penetration, which inhibits growth of eelgrass. Non-point pollution sources can cause eutrophication of receiving water, which increases opportunities for growth of *ulva* (sea lettuce), which competes with eelgrass. In addition, failing sewage systems located on surrounding property can contribute fecal bacteria and excess nutrients to the nearshore area and contaminate local shellfish populations. As a consequence of polluted waters and paralytic shellfish poisoning (PSP), shellfish harvesting is prohibited or conditionally limited by the Washington Department of Health in some areas within or adjacent to the reserve.

⁵ King County Shoreline Master Program Chapter 25 – Shoreline Master Program: Repair or Replacement of Shoreline Protection, Piers, Moorage Facilities, or Launching Facilities (May 4, 2000), and King County Comprehensive Plan sections E-107, E-124, E-168, E-169, and E-170, and rules that regulate the construction, repair and replacement of shoreline armoring structures.

⁶ Washington Department of Fish and Wildlife regulations defined in WAC 220-110-285 – Single-family residence bulkheads in saltwater and WAC 220-110-050 – Bank protection.

Management Strategy:

The DNR will:

- Review past and present non-point source pollution programs;
- Identify sources of non-point pollution and prioritize areas of concern;
- Work cooperatively with the King County Health Department, local entities, and property owners to formulate and implement strategies to address non-point source impacts; and
- Seek funding sources to assist with repairing and improving sewage systems and for clean up.

5.4.3 Docks, Floats, and Mooring Buoys on Private Property

Numerous recreational docks, floats, and mooring buoys exist on privately owned aquatic lands adjacent to the reserve. These structures are important aspects of island living for local residents, as they provide moorage for recreational vessels and local access to the aquatic resources of Puget Sound. While recreational docks, floats, and mooring buoys have beneficial aspects, they may also cause some cumulative negative impacts associated with shading, toxic construction materials (i.e., creosote treated piling), and scouring (i.e., improper buoy installation). The DNR does not have management authority over private recreational docks and mooring buoys that are on privately owned tidelands and shorelands. King County and WDFW are the regulatory agencies with the primary responsibility to manage these structures and DNR will rely on their regulatory authority to minimize impacts from docks and mooring buoys on privately owned lands.

Management Strategy:

The DNR will:

- Provide adjacent landowners information and establish partnerships to promote conservation of the habitats and species within the reserve; and
 - Work cooperatively with adjacent landowners (on a voluntary basis) to locate funding sources for the adoption of BMPs and improvements to their structures.
-

6.0 Adaptive Management and Plan Updates

The management plan shall be reviewed and updated every ten years throughout the 90-year term of the reserve designation. Adaptive management of the reserve will integrate changes in scientific knowledge concerning the site, conditions of habitats and species, and existing uses of state-owned aquatic lands. Data and reports generated from research and monitoring activities will be also be used to guide DNR in determining if management actions are meeting the goals and objectives of the reserve. If management actions are not successfully contributing to the goals and objectives for the reserve, then they will be modified, monitored, and evaluated during the following 10-year review process in accordance with adaptive management strategies.

DNR will include new scientific findings into adaptive management - and that should not be restricted to every 10 years. Existing uses within the aquatic reserve will also be evaluated during the ten-year management plan review process. Leases in good standing will continue to be honored for the term of the lease, but lease-related activities will be reviewed based on the existing plan, to evaluate the progress that has been achieved in implementing the conditions of their site-specific plans. The review will include an evaluation of whether lease-related activities are showing progress in decreasing or increasing impacts to the habitats and species of the reserve. During the review process of the management plan, site-specific plans of lessees may require updating. An evaluation will be made on the progress and success of lessees on their efforts to implement specific actions to achieve the objectives of the reserve. During and after the ten-year management plan review process, DNR will continue to work cooperatively with lessees to meet the conditions of the lease and the development and implementation of site-specific management plans.

6.1 Modification to Reserve Boundary

Boundaries can be expanded or decreased during the regular 2-year reserve nomination process. The DNR staff may recommend changing the reserve boundaries based on new information or conditions at the site identified through the 10-year management plan review process.

7.0 Capital and Management Funding

The DNR has identified numerous actions that should be taken to achieve the objectives of the reserve. These actions include, managing activities on state-owned aquatic lands, working cooperatively with the local community and regulatory agencies, reaching out to recreational user groups, and undertaking research and monitoring activities. These actions will take time and funding to implement.

The DNR currently has an assistant regional manager, district manager, and land manager who are responsible for the management of field activities on state-owned aquatic lands in the geographic area of King County that includes the reserve. The DNR headquarters has an assistant division manager, planning unit supervisor, aquatic reserve program manager, and lead scientist who are responsible for the programmatic development and implementation of the aquatic reserve program at the state level. The DNR will attempt to implement components of this management plan with a percentage of time from these existing six staff until additional funding and staffing can be allocated specifically for the management of the reserve. The implementation of this management plan will compete with existing activities and priorities of these staff.

Under ideal circumstances, an aquatic reserve site manager would be dedicated to working at the reserve. The site manager's responsibilities may include management of other regional aquatic reserves established in the future. The reserve manager would likely serve at a level equivalent to a Land Manager 2, within the state system. Land Manager 2s are currently at Range 48, with a salary level of approximately \$35,000 to \$45,000 per year (This figure does not account for other benefits and overhead, which could add approximately 15 percent per year). This position could work directly for the DNR or for an external government or non-government agency that agrees to partner with the DNR in the management of the aquatic reserve. In either case, in the event that a reserve manager position was funded in the future, the position would ideally be physically located at the reserve area (or manage multiple sites and located part time at each site) where they could integrate into the local community and participate at the local level in the implementation of the reserve management plan. Funding for the reserve manager position could come from future legislative appropriations to the DNR, donations from private entities or individuals, grants, and/or dedications of funding from lessees (as a means to primarily serve the objective of the reserve).

Funding needs for other, more intensive management efforts (such as research and monitoring) and capital improvement projects (such as structure modifications, restoration projects, or acquisition projects), will be determined when specific components of this management plan are being implemented.

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